Railway Age

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Don't Put It Too Strong

THE *Railway Age* has repeatedly expressed criticism of the railway officer who displays a lack of consideration, if not actual discourtesy, for the representatives of the railway supply manufacturers. Such men usually do more harm to the railroads than to the industry whose salesman they have mistreated. But it is to be questioned whether the criticism offered by the salesman is always a just one. There is reason to believe that many an unsatisfactory interview has arisen from a failure on the part of the salesman to appreciate the railway officer's point of view and habit of mind. Thus, a certain engineering officer, after listening for some time to a voluble flow of language, interposed the comment that the speaker was not an engineer. "I know you are not," he continued, "because you have made claims for your product which any engineer would know to be untrue. Your statements exceed physical possibilities, no matter how perfect your material may be." But even in cases where extravagant claims are not made, sympathy is frequently alienated by the manner in which the qualities of a material are presented. For example, the report of a strength test is displayed which states that under certain loads competing materials failed completely, while at still higher loads the representative's product was still in "perfect condition." Such a comparison makes no appeal to the engineer. He knows that all materials, including that offered by the salesman, have their limitations and he would consider it no discredit to that particular material to learn what these limitations are. In fact, it rankles him to have the salesman withhold the very information he wants, the ultimate strength of his product. The failure of the engineer to "warm up" does not necessarily imply that he is cold-blooded or that he is of a vacillating temperament. He is not given to snap decisions because through long training he has developed a habit of mind which compels him to consider all facts carefully before he arrives at a decision. A consideration of the characteristics of the purchaser and a less cock-sure presentation would sometimes go a long way in enlisting his confidence.

The Government as a Ship Operator

WHILE the government's experience with the ownership and operation of the merchant fleet which it acquired during the war is not necessarily a perfect example of what would have happened if the government had retained the railroads indefinitely, many phases of that experience are such as to afford cause for rejoicing that the railroads were returned to private operation in 1920 instead of being kept under government operation as the ships were. A select committee of the House of Representatives has just submitted a report on the latest of a series of investigations of the affairs of the Shipping Board, which calls attention to the fact that since the board was created it has had 27 different commissioners, 12 of whom served less than a year, while its corporate subsidiary, the Emergency Fleet Corporation, in the eight years of its life has had 55 trustees, 43 of whom served about a year, 10 different controllers, 7 different treasurers, and 15 different directors of operations. It might have added that since the recent reorganization of the Fleet Corporation following the dismissal of its president and one vice-president by the board, three more of its vice-presidents have resigned following reductions in their salaries and one after a controversy with the new president of the corporation. Some of these changes, the report says, were due to politics, some to voluntary retirement at the end of the war period, some to the uncertainties of government employment, and some to controversies between members of the board, between commissioners and trustees, and between the commissioners and the president of the Fleet Corporation. "It is remarkable," the minority report observes, "that with such shifting personnel in the high executive positions of these two organizations, there could be anything approaching continuity of policy or of efficient and effective organization and operations." Incidentally the report is divided on party lines, consisting of a minority report signed by three regular Republicans whose recommendations generally are in accord with President Coolidge's merchant marine policies, and a majority report signed by three Democrats and one La Follette or Progressive Republican, who oppose his ideas.

Gerrymandering the I. C. C.

ALTHOUGH the Interstate Commerce Commission is generally regarded as rather free of politics internally, externally the politicians concern themselves with the commission rather freely. Recently there has been agitation for the appointment of a member of the commission from the South, which has expressed itself whenever the Senate was called upon to confirm the President's appointment of a new commissioner. Senator E. D. Smith of South Carolina, chairman of the Senate committee on interstate commerce in the last Congress, who was one of those who raised this question when Thomas F. Woodlock was appointed, has introduced a bill to increase the membership of the commission by dividing the United States into four divisions and providing for the appointment of three commissioners for each division, as vacancies occur, giving priority to the division that has no representative or the least number of representatives as members of the commission. A casual reading of the bill would indicate that the Senator's ideas of the geography of the United States were as vague as some of his ideas on railway economics. He omitted Illinois, Indiana, Kentucky and West Virginia entirely in his assignment of states to the four divisions; placed Wisconsin as well as Nebraska in the southwestern division; Oklahoma and Texas as well as Arkansas and Louisiana in the southeastern division,

and California, Nevada and Utah as well as Iowa in the northwestern division. The omission of the four rather centrally located states may have been due to an oversight, but classing Wisconsin as a southwestern state in relation to the idea of a local viewpoint on transportation questions seems almost as strange as the effort sometimes made to class Senator La Follette and others of the Wisconsin delegation in Congress as Republicans. Can it be that there is method in the Senator's geography and that adding Wisconsin to the southwestern division is a "joker" because Wisconsin already has two commissioners, Meyer and Esch, while the southeastern division, as set up in the Smith bill, is made up entirely of 12 states that have no commissioner at present? Under the provisions of the bill this would require that Commissioner No. 12 should be appointed from the southeast where Senator Smith lives, while Messrs. Esch and Meyer would be for a time the sole representatives of Arizona New Mexico, Nebraska, Kansas, Wisconsin, and Missouri.

Training for the Future

ARE the young men in the various departments on your road anxious to get a better and broader understanding of railroading in general and to master the details of the work on which they are now engaged or to which they may be promoted in the future? Interviews with boys who attended the recent conference of the younger railroad men at Pittsburgh, and listening in on some of the group discussions, indicate that many of these young men are ambitious to fit themselves for larger responsibilities and more important positions. Except in a comparatively few cases, however, no special effort is being made by the management to help them in so doing. It is true that a few roads have modern apprenticeship methods in the mechanical department in which shop and schoolroom instructors see that the young men are thoroughly trained in the proper way of doing the work and as to why the particular way of doing it is the best, and how their work is related to the proper functioning of other parts of the organization. Outside of this, however, little is being done to encourage and help the young men to develop and fit themselves for promotion. In some cases the boys are taking things into their own hands by the formation of what is known as American Railroad Employed Boys' clubs. While such clubs have a well defined program to develop the members mentally, physically, socially and spiritually, one of the more important parts of the program is to discuss vocational problems and to invite officers and supervisors to talk to them and advise with them. Obviously it is a bit difficult to start the organization of clubs of this kind because most of the boys are lacking in experience in things of this sort. A little encouragement from their superiors, however, will go a long way in helping to form successful clubs of this sort, which cannot but have a helpful influence in preparing the men who have to assist in shouldering the future responsibilities of the railroads.

Competing Buses at Railroad Ferries

THE influence of the Hudson river on New York City is not altogether benign. True, its presence gave the city its inception and occasioned its growth, but, while it is a boon to water-borne traffic, it places a most troublesome barrier in the way of land traffic—railway and highway alike. Only one railroad has felt justified in incurring the expense necessary to carry its rails under the river, thus gaining direct entrance to the city, and this only for passenger traffic. All other lines terminate on the Jersey shore, whence traffic must take to boats or, in the case of passengers, to the Hudson tube trains. This changing of conveyances means trouble and loss of time to passengers and doubtless explains the popularity of the motor bus which has achieved a greater development in this section than in any other suburban area—the buses entering the city by ferry-boat so that passengers may go to their homes in one vehicle without the trouble of changing conveyances. But the railroads operate the ferry-boats and are thus being forced to serve as accessories to their own financial injury. There is, of course, no remedy for this situation; ferry lines are common carriers and must take whatever traffic offers itself. However, the charge is made—and, if it is not true now, it certainly has been in the very recent past and may appear again—that motor buses are being given the right-of-way over other vehicles at these ferries. This is, of course, the worse kind of injustice. The ferry operators are not to blame for the situation—it is the local police who regulate the line-up of vehicles. However, such discrimination is not the sort of thing which is relished by the general public, particularly the operators of other vehicles. Railroads which operate ferries cannot determine the order of precedence of vehicles which use them, but is it not altogether likely that if they would at least check up to detect all cases of discrimination and make them known to the public through the press that the condition would quickly and permanently disappear? The railroads must give ordinarily efficient service to buses on their ferries; they ought never to be forced to give a superior and discriminatory service to any class of vehicles—least of all to those whose operation means financial loss to them.

Locomotive Utilization

RECENT railroad operating records, in some respects surpassing any records previously established, are due in no small measure to the growing appreciation that the tremendous sums of money invested in locomotives must be made to earn larger returns. While the railroads generally are fully alive to the importance of intensive locomotive utilization and are effecting marked improvements in this direction, this work has only begun. Every effort should be made to foster interest in the subject and spread information regarding what can and should be accomplished among the rank and file of railroad men who, in the last analysis, are the ones through whom improvements in operation are effected. As has been previously noted in these columns, one of the most important committees of the American Railway Association in its potential influence for improved railway operation is the Joint Committee on Utilization of Locomotives, composed of representatives of the operating and mechanical divisions. This committee, under the leadership of T. B. Hamilton, vice-president and general manager of the Pennsylvania Western Region, presented a progress report in June, outlining ten important principles the application of which will tend to assure the most efficient use of locomotives. The sub-committee, consisting of eleven members of such rank as general road foreman of engines, mechanical engineer, master mechanic, assistant superintendent, trainmaster and fuel conservation engineer, has in recent months been on the road three-quarters of the time collecting data. It has already made an intensive and extensive study of operation on eight

leading railroads and accumulated a mass of information and data which, with that obtained on three additional roads still to be studied, will be summarized and made available in a report at the Mechanical division meeting at Atlantic City next June. The benefits of this work will not be deferred until June, however. Confidential reports of field surveys have in some cases been furnished to railroads, and those roads already inspected or which expect to be in the near future have naturally keyed up their operations so as to make as good a showing as possible. The work now being done by railroad operating and mechanical men to cause locomotives to be used more effectively is bound to show increases in miles per locomotive per month, in gross ton-miles per train mile and train hour and in related transportation results within the next 12 months.

Training Key Men in Industry

ONE of the outstanding developments in the railroad field during the year now coming to a close has been the awakening recognition on the part of the railroads of the necessity for giving more attention to training the supervisory staff in the art of leadership. While some of the industries have made considerable progress in this direction, railroad officers have found it difficult to secure comprehensive detail information as to approved methods of procedure. This is not strange because the development is a comparatively new one even in industry. Then, too, the problem has been approached in many different ways, depending upon local conditions and the facilities nearest at hand. A considerable number of groups of supervisors have been formed on the railroads during the past few months to study the art of leadership. In some cases a series of lectures has been arranged for; in other instances group study coures are being followed, or important management questions are being discussed on an open forum basis. Apparently, also, a large number of individuals have enrolled in correspondence courses. In some places the railroad officers and foremen have united with supervisors from the industries in community courses of foremanship training, usually held under the auspices of the Y. M. C. A. The Department of Manufacture of the Chamber of Commerce of the United States made a noteworthy contribution to this development in its survey on "The Fundamentals in the Development of Industrial Foremen," which was commented upon in the *Railway Age* of November 21. In this connection our attention has been drawn to another important survey on "Training Key Men in Industry," which was made in the form of a report by the Policyholders' Service Bureau, Group Insurance Division of the Metropolitan Life Insurance Company. This report considers the requirements of a good training course, what to teach the foremen, methods of training foremen, cost of foreman training, how to set up foreman training, and what individual plants have done. Those roads which have started leadership training groups would do well to take full advantage of surveys such as those mentioned, in order to check up on their methods of procedure and make sure that they are on the right track. Some foremanship training groups, in both industries and on the railroads, have been failures or have not proved very productive. Others have proved remarkably successful. There have been good reasons for the failures and there have been good reasons for the successes. Surveys of this sort will help to locate and guard against causes of failure, and properly studied, can do much to insure the success of the movement.

The Gooding Bill and the Farmers

THERE is nothing more amazing than the kind of legislation regarding freight rates proposed, and even passed, by members of Congress who seek thereby to promote the prosperity of particular sections of the country or classes of the people. Representative Hoch of Kansas has been among the most zealous of the public men who have been promoting railway legislation purporting to be intended to help the farmers. He was one of the authors of the Hoch-Smith resolution. He has now introduced in the house the same bill that has been introduced in the senate by Senator Gooding of Idaho absolutely to prohibit the railways from charging a lower rate for a longer than for a shorter haul to meet water competition, and thereby to deprive the Interstate Commerce Commission of its present discretionary authority to permit this to be done when in the public interest.

For reasons which were given in an editorial in the *Railway Age* for December 5 entitled "Freight Rates and Commodity Values," the application of the principles of the Hoch-Smith resolution in rate-making would increase and not reduce freight rates on farm products. The resolution provides in effect that rates shall be readjusted more nearly in accordance with the value of commodities. But freight rates are now relatively much lower in proportion to the values of farm products than to the value of products of forests and products of mines, and if the principles of the Hoch-Smith resolution were consistently applied there would be large reductions in the rates on forest and mineral products and large advances in the rates on manufactured articles and farm products.

The Gooding bill, for which Mr. Hoch has become sponsor in the house, likewise has a direct tendency to increase freight rates on at least nine-tenths of the products of the farms of western territory.

Most of the opposition to the efforts of the railways to get authority to make lower rates to the Pacific Coast than to intermediate territory is based upon the assumption that railway managers do not know their business. The contention of railway managers is that they are now moving many freight cars empty to the Pacific Coast to handle eastbound freight, and that if they were allowed to make rates which would enable them to get more traffic to the coast in competition with the steamship lines, without at the same time reducing their westbound rates to intermediate points, they would be able to increase their net earnings. This, they argue, would make it possible for them to earn a fair return without charging as high rates on traffic in western territory not moving to the Pacific Coast as would otherwise be necessary. This contention is controverted by opponents of the making of reduced rates to the coast. They claim that if rates to the coast were reduced this would reduce railway net earnings and increase the necessity for higher rates on all traffic not moving to the coast. They say that all the railways are seeking to do is to destroy steamship competition through the Panama Canal.

Who are more likely to be right in such a controversy —railway officers who have devoted their entire business lives to studying means of increasing railway net earnings, or men who know little or nothing about the railroad business? The claim that all the railways are seeking to do is to destroy water competition is absurd. Railway officers know that steamship competition through the Panama Canal can never be destroyed. They know that all they can hope to get is some readjustment of the

rates which will not make it impossible, as it is at present, for the railways to compete with the steamship lines; and it cannot reasonably be assumed that they know so little about their own business that they would deliberately adopt a policy that would reduce railway net earnings.

There is no student of the subject whose opinion is worth anything except for political purposes who does not believe that the establishment of real competitive relations between steamship rates and rail rates to the Pacific coast would enable the transcontinental railways to get more traffic to handle to the coast and thereby increase their net earnings. Now, the farmers of the west hardly benefit at all by the present low rates via the Panama Canal. Practically all of the farm products of the Pacific Coast, of the intermountain territory and of the western territory east of the Rocky Mountains are shipped eastward, and by rail. It necessarily follows that if the railways could increase their net earnings by reducing their rates to the Pacific Coast they could make lower rates than otherwise would be necessary on all the farm products of the west that they transport to eastern markets. Therefore Representative Hoch, in supporting the Gooding bill, is doing exactly what he did in promoting the Hoch-Smith resolution—viz., while believing that he is promoting legislation that would help the farmer, he actually is promoting legislation that would tend to increase freight rates on western farm products.

This is not merely a railroad view of the matter. Its correctness is recognized by many traffic experts who have studied the subject on behalf of western producers. The fight against lower westbound rates to the Pacific Coast than to intermediate points has been led by a faction in Spokane and Salt Lake City and other intermountain communities consisting of jobbers shipping in merchandise from the east. One of the largest organizations of producers in the west is the Western Pine Manufacturers Association, a large part of the forests and mills of whose members are in the intermountain territory. This organization and its traffic manager, R. J. Knott, are advocating the reduction of rates to the Pacific Coast, and strongly opposing the passage of the Gooding bill. They see that the existing adjustment of freight rates in the west, which would be made permanent if the Gooding bill were passed, tends to increase all freight rates on western products moving eastbound by rail.

In a recent public statement Mr. Knott gave the following facts: "During the month of July, 1925, the northwest shipped to the markets of the east 17,034 carloads of produce in box cars. How did we get the cars to load the 17,034 carloads shipped? There came west 6,525 loaded with freight consumed here or exported, and 11,876 came out absolutely empty. Who pays the cost of bringing the 11,876 empty cars west? The entire amount was paid by the producer who had to have the cars or forego shipping his produce, be it lumber, fruit, grain, wool, ore or anything else, as all producers are exactly in the same position. The prosperity of the interior communities depends entirely on the produce they may market and not upon the inbound freight consumed." Mr. Knott asked: "How does this continual agitation concerning the Gooding bill harm the interior communities?" He made, among others, the following answer to his question: "It has contributed towards the railroads requesting an increased freight rate in that it has no doubt delayed the decision of the Interstate Commerce Commission on fourth section relief cases, and the carriers have been obliged to seek other means of obtaining revenue."

As Mr. Knott indicates, all the producers of the intermountain territory are in the same boat; and most of the producers on the Pacific Coast and all the producers in western territory east of the Rocky Mountains are in the boat with them. Every pound of remunerative freight business to the Pacific Coast that the railways of western territory are losing because of the present false adjustment of freight rates in western territory is making their net earnings smaller than they otherwise would be and thereby increasing the necessity for the general advance in rates, including those on farm products, for which the western lines are now asking. The producers of the west, and especially the farmers, will have no reason for being grateful to any western member of Congress who votes for the Gooding bill.

The true remedy for the situation created in western territory by the present relations between steamship and rail rates is clear. Passage of the Gooding bill would merely make matters worse. It might or might not help the embattled jobbers of the intermediate communities, who are responsible for the infamous and false diatribes against the railways broadcasted by the Intermediate Rate Association, but it would be harmful to practically all the producers of the west. The reasonable and helpful way to deal with the situation would be to adopt legislation, as favored by the resolution adopted at the last convention of the National Association of Railroad and Utilities Commissioners, placing the intercoastal water lines operating through the Panama Canal under the jurisdiction of the Interstate Commerce Commission as to rates, service, etc., to the same extent as rail carriers. The commission could then establish according to its best judgment the relations between water and rail rates which would be in the public interest and which would give effect to the purpose of Congress as stated in the Transportation Act to keep both rail and water transportation in full vigor and efficiency.

The Gooding bill is a product of the wild anti-railroad fanaticism which prevails in certain western intermountain communities in which zeal for a rigid long-and-short haul provision has taken the place in the religion of many of the people that ghost dancing and witch burning formerly had in some religions. It is passing strange that advocates of this legislation are found among members of Congress representing states the interest of whose people is directly opposed to it.

A Great Task Well Performed

AFTER the railways were seized by the government at the end of 1917 it was often predicted that the claims growing out of their seizure and use would result in vast and almost interminable litigation. The claims of the railways resulting from federal operation aggregated about $1,000,000,000 and the claims of the government against the railways about $440,000,000. The way these claims were settled is indicated by facts and figures given in an article in the *Railway Age* for December 19, page 1151. They led to no litigation. The negotiations resulted in the debtor roads paying the government less than one-half of what it asked for and in the government paying the creditor roads less than one-fourth of what they asked for.

When it is considered that there was more money involved than ever before in any group of transactions between a government and owners of private property, the success attained in making settlements without resort to the courts must be regarded as one of the most extraordinary achievements in the commercial history of mankind. This success is not attributable to the way in which the contracts between the government and the railways were drawn or to the legislation under which these contracts were made, but to the ability and fair-

ness shown by Director General J. C. Davis in representing the government and to the responsive reasonableness and fairness shown by those who represented the railways. Attempts to drive shrewd bargains were made on both sides, and certainly if the government had had to compensate the railways not only for the use and deterioration of their physical properties, but also for the destruction of the morale of their employees and of their earning capacity that occurred, the amounts paid by the government would have been vastly larger.

No doubt, however, it will in the long run prove to have been wise for the railways to pocket the large losses incurred by them which were of such a character as not to be susceptible of exact calculation and to make the best settlements they could out of court. While government operation caused them large losses of the kind mentioned, it also helped to kill sentiment for government ownership and to cause enactment of the constructive provisions of the Transportation Act. Apparently government control ultimately will prove to have been worth far more than it cost to both the railways and the public.

Proposed Labor Legislation

IT now seems most probable that in a short time a bill to change the labor provisions of the Transportation Act will be introduced in Congress with the support of the leaders of the railway labor brotherhoods and a majority of railway executives. Chairman Aishton, after a meeting of the Association of Railway Executives in Chicago, Monday, issued a statement saying, "The matter was discussed at considerable length and marked progress was made toward the adoption of a plan which will be acceptable to the carriers and the employees and at the same time provide for the protection of the public." It is understood the committees that have represented the four train service brotherhoods and the executives in recent conferences will now hold conferences to perfect the details of the proposed legislation.

The public has not yet been advised what machinery for the settlement of labor controversies the proposed legislation would set up. There can be no question that it will be much nearer what the leaders of the brotherhoods want than what most railway executives would prefer. A great majority of railway executives believe that the present provisions of the Transportation Act, if the labor unions and the railways had all given them a fair trial, would have in the long run worked fairly and beneficially to labor, the railways and the public. Some railways, however, have not liked these provisions, and the leaders of some of the train service unions recently have refused to submit controversies to the Railroad Labor Board or to abide by its decisions.

When the leaders of the engineers' and firemen's brotherhoods succeeded recently in getting a general advance in wages by threats of strikes, and while refusing to appear even as witnesses before the Labor Board, it became a most serious question whether the labor provisions of the Transportation Act had not become inoperative as to the most powerful unions of employees. Many people believe that legislation passed in pursuance of an agreement by the labor leaders and the railways may reasonably be expected to work satisfactorily. Certainly if Congress does pass legislation supported by both the railways and the unions, each of them will assume a moral obligation to the public to try to make it work so as to establish reasonable wages and working conditions and as to prevent interruptions of transportation by strikes.

There is, however, nothing in the history of the last 20 years to warrant very optimistic expectations. The Newlands Act was the result of an agreement between the railways and the labor brotherhoods and it broke down in 1916 because the very unions that helped to get it passed, refused to arbitrate under it. They paid no more regard to it then than to the labor provisions of the Transportation Act more recently. The leaders of these same unions have been engaged almost ever since in constantly carrying on propaganda and political movements to discredit private management and even destroy private ownership. It may be that an agreement by the railway executives to cooperate with them in securing legislation to replace the present labor provisions will result in an era of good feeling and amicable negotiations and settlements, but the *Railway Age* will continue to read "Labor," the weekly paper published by the railway labor unions in Washington, for its information as to the attitude and policy of most labor leaders toward railway regulation and private ownership.

New Books

The Wonder Book of Railways, Edited by Harry Golding. 256 *Pages, 7½ in. x* 10 *in. Bound in Cloth. Illustrated. Published by Ward, Lock & Company, Ltd., London. Price,* 6 *Shillings.*

Railways for All, by J. F. Cairns. 384 *Pages, 6¼ in. x 8½ in. Bound in Cloth. Illustrated. Published by Ward, Lock & Company, Ltd., London. Price,* 6 *Shillings.*

My Railway Book, by Cecil J. Allen. 192 *Pages, 7½ in. x* 10 *in. Bound in Cloth. Illustrated. Published by John F. Shaw & Company, Ltd., London. Price,* 5 *Shillings.*

Any one of these three books would, we believe, attract and hold the interest of any normal person—man, woman or child. All, as will be noticed, are English publications. Two of them, the "Wonder Book" and "My Railway Book," are intended primarily for young people and the material they present is rather elementary, but they have many illustrations in color and no one has so little of the child in him that he will not enjoy the pictures. "Railways for All" is intended for adults and its treatment of various railway subjects is consequently more extensive than that of the other two. The purpose of all three, however, is to give the layman a clear idea of all he is likely to be interested in about the railways—and by layman is meant also the railway man who perhaps does not know all he might desire about departments other than his own.

The books, being English, and of necessarily more restricted subject matter than another popular railway book reviewed in these columns not long hence ("Railways of the World"—*Railway Age* of March 7, page 540), place their main emphasis on the British railways and consequently cannot be of much help to the American reader in understanding American railways.

The two books intended for younger readers have chapter headings such as: What Makes the Engine Go? Do You Know the New Locomotive Numbers? The Grouping of British Railways; Famous Expresses of All Countries; A Chat with the Engine-Driver; Fighting the Snow; Meals on Wheels; World-Famous Express Trains. "Railways for All," while not so gaudy with illustrations, contains more detailed information regarding railway history, locomotives, cars, signaling, construction, stations, operation and so on.

We have said that these books are English, which makes them objects of interest rather than of immediate value to Americans. This does not mean, however, that

their viewpoint is provincial and that they do not contain information about railways outside the British Isles. They do. And we conscientiously recommend all of them to persons whose interest in railways goes beyond the confines of this continent and who already know enough about our railways not to feel the lack of emphasis on them in these books.

A Manual of Locomotive Running Shed Management. By Walter Paterson, staff department, London, Midland & Scottish Railway, Manchester, England, and Harry Webster, running department, London & North Eastern Railway, Lowestoft. 212 pages, illustrated. 6 in. by 9 in. Price $6.00. Published by Charles Griffin & Company, Limited, London, and J. B. Lippincott Company, Philadelphia.

The object of this book is to present, in a convenient form, the essential information relative to the efficient management of steam railway locomotive and car shops as conducted in Great Britain. For the mechanical department officer engaged in railroad work in this country, considerable information in this book is of interest, especially the methods recommended for handling locomotive repairs. The authors have intentionally refrained from giving detailed descriptions of shop processes and operations, but have included descriptions of engine-house equipment and practice. The book contains 13 chapters, with 44 illustrations, discussing such subjects as the organization of the staff and functions of its various members, personnel and employee welfare, stores department organization and management, fuel conservation, computation of locomotive mileage, locomotive and coach cleaning, locomotive and car repairs, causes and remedies for engine failures, methods used in handling wrecks, and the utilization of waste material. A number of tables are also given in an appendix at the back of the book showing the approximate temperature of a fire as indicated by its appearance, the approximate temperature of a car journal as indicated by its appearance, the strength of chains, capacity of water tanks, the delivery of injectors in gallons per hour, etc. Descriptions of a number of jigs and tools suitable for engine-house and wrecking service are given in the chapters on locomotive repairs and break-downs.

Travelers' Medical Guide for 1926. Compiled by Wm. Bierman, M.D., 115 pages, vest pocket size, 3 in. x 6¼ in. Published by Travelers' Medical Guide, 293 Central Park, West, New York City. Price $1.00.

This book has been prepared for the National Council of Traveling Salesmen's Associations, and is essentially a directory of physicians and dentists in the principal cities of the country. It is very well arranged. The states are arranged alphabetically, and the cities alphabetically under each state. For example, Bangor is the second city under Maine. The item reads, "Dr. J. H. Cox, 2-4, 7-8; 159 Union Street; Phone 366."

The first 20 pages contain useful information on hygiene. The introduction says that the book is not an advertising directory, no charge of any kind being made, or pay accepted, and the names have been selected strictly on a professional basis. Specialists are indicated; but the user of the book is advised, when there is any doubt, to go to the general practitioner first. The main points in making the selections were (1) that the doctor should be of the highest standing, (2) that his fees be moderate, and (3) that his office is readily accessible to the business center of the city. The book contains a scheme, with blank pages, for "continuous treatment" where a man is traveling from city to city.

For the smaller places generally one physician is named, and for larger places in proportion to size. For Waterbury, Conn., five names are given; Boston, Mass., 11; Albany, N. Y., four. In New York City only the specialists are named; for a general practitioner application should be made (by telephone) to the Travelers' Medical Guide Exchange.

The Regularization of Employment; by H. Feldman, Assistant Professor, Industrial Relations, Amos Tuck School, Dartmouth College. 437 pages, 5½ in. x 8 in. Bound in cloth. Published under the auspices of the American Management Association by Harper & Brothers, New York.

This is a thorough treatise on the subject announced in the title and a book which will interest all persons who have the welfare of the working population at heart—which is another way of saying the welfare of American industry. The author finds that employment is tending to grow more irregular. He analyzes the causes for this and its effects and then proceeds to discuss the various remedies, proposed or actually used. The author was employed by the economic advisory committee of the President's Unemployment Conference in 1921 and has followed the subject closely for a number of years. His treatment of it therefore is entirely adequate. One could wish for more specific information regarding the problem from a railroad point of view, but that is doubtless impossible in a book which attempts to cover the whole subject and still not be large.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Bulletin No. 1, Chicago Great Western Railroad. Report of the Development Division, containing also a list of questions asked at public meetings along the line and answers to a number of questions on transportation. 63 p. Published by Chicago Great Western Railroad, Chicago, Ill. *Apply.*

Ninety-Four Years of Progress, by Case, Pomeroy & Co. An illustrated study of the Southern Railway and the territory it serves, 61 p. Published by Case, Pomeroy & Co., Inc., New York City.

Putnam's Economic Atlas. A survey of the world's trade, economic resources, and communications. Maps and diagrams by countries and commodities. "K. Dual classification of commodities" p. 27-33. 112 maps and charts. 33 p. Published by Putnam's, New York City. $19.75.

Tales of the Train, by E. B. Leigh-Bennett. Interesting details and problems of operation of the Southern Railway of England. Illustrated. 40 p. Published by Southern Railway Company, London, England.

Periodical Articles

Computation of Good Will Profits, by C. J. Foreman. Legal valuation as evidenced in numerous court decisions including several involving railroads both here and abroad, and influence of accounting methods. American Economic Review, December, 1925, p. 652-664.

Is Bus Fare Structure Sound? by Edward J. Murphy. Analysis of bus companies' reports to California Railroad Commission. Aera, December, 1925, p. 853-856.

The Khyber Railway as an Indian Defense. Account of opening and strategic value. Literary Digest, December 19, 1925, p. 19-20.

Letters to the Editor

Transverse Fissures Due To High Wheel Loads

WASHINGTON, D. C.

TO THE EDITOR:

Your interesting and timely editorial in the issue of December 5, concerning the Manchester accident of August 25, 1911, and the Victoria accident of October 27 last, each of which was due to a transverse fissure in the rails, is noted with deep concern. Those two accidents were the most appalling which have occurred due to the presence of transverse fissures, involving the loss of over fifty lives and injuries to nearly two hundred persons. In the interim of 14 years other accidents have occurred from the same cause, involving loss of life and personal injuries, while the total number of known transverse fissured rails has reached an enormous number, between ten and twenty thousand.

The report of the Interstate Commerce Commission on the Manchester accident first brought into prominence, as your editorial states, this type of fracture, describing it and allocating it as a definite type. The report of August 25, 1911, went farther and explained specifically its formation in the following language:

"The cold rolling of the running surface of the head of the rail by heavy wheel pressures has introduced internal strains at and for a short distance below the running surface. These internal strains are of compression. * * * It follows that there must be an opposite strain of tension to balance them in some other portion of the rail. * * * The tensile component * * * next below the part affected by compression * * * leads to an explanation of the presence of fissures in the head where they are being formed. The introduction of internal strains * * * seems adequate to explain the occurrence and frequency of these interior fissures."

The report further stated that transverse fissures should not be found in new rails, those which had not been exposed to track conditions, and none have been found in such rails. In those early days unsuccessful efforts were made in quest of transverse fissures in new rails on the part of those who were unprepared to accept the physical and metallurgical reasons which were ascribed as the cause of their formation.

The problem is one of physics, as rails will fracture when exposed to strains which are beyond their ability to endure, the same as other engineering members will. The trouble seems to have been in the failure to recognize the influence and effects of intense concentrated loads, which are peculiar to and always present where loads are carried on wheels. Girder strength of the rail is not the prime consideration. If it were, rails would fracture from the base instead of the interior of the head. The crux of the problem is in the intense impinging pressure at the area of contact between the tread of the wheel and the head of the rail. The intense local strains of compression in this affected volume of metal are sustained by that zone without rupture. This part of the rail does, however, transmit pressure to adjacent portions of the head where the strains are converted to those of tension, and in such zones we have the nuclei of transverse fissures. The predominance of transverse fissures on the gage side of the head is accounted for by the increased wheel effects on that side.

It is well known that the harder rails, according to chemical composition, are the more prone to display transverse fissures, and without material change in shape of the head or showing much loss of metal by abrasion. Medium grades of steel, employed in forgings and structural members, are not strong enough to sustain present wheel loads. Whence it appears that present service conditions demand the use of rails made of steels which are sufficiently rigid to retain their shapes but which display transverse fissures without warning. When upward of fifteen thousand rails display transverse fissures and no determinate cause is discovered attaching to the quality of the steel it would seem that the original contention in the Manchester report of 1911, that "the danger zone of steel rails had been reached and possibly entered upon by current railroad practices," had a basis of justification. It is futile to look for a remedy against the rupture of steel exposed to overstraining loads. There is none. Fourteen years experience on the part of the railroads with 15,000 fractured rails should be recognized as offering sufficient evidence on this point. How many rails containing incipient transverse fissures, undiscovered and undiscoverable, are now in the track is a most disquieting uncertainty. That additional accidents will occur, under present service conditions, is just as certain as it was the day before the Victoria accident.

In the consideration of transverse fissured rails, the query at the outset presents itself, what is there at the nucleus? The answer to which is nothing. There is no foreign inclusion of any kind, and not even a characteristic difference in composition or structure in the contiguous metal. The space between the walls of a transverse fissure is a void. No manufacturing condition is known to influence the formation of a transverse fissure.

Cooling strains are set up in rails after the processes of fabrication are completed, and by some are considered the necessary precursors of transverse fissures. Each of the fifty million, or more, rails in service was subjected to cooling strains in no respect differing from the 15,000 rails which have displayed transverse fissures. Cooling strains are introduced in all rolled, forged and cast shapes, steel rails having no monopoly in this feature.

It is customary to hear transverse fissures spoken of by the use, or misuse, of the word "defect." The word implies the existence of some primitive, inherent, condition which by sufferance is allowed to exist, and for which there is a definite responsible cause. Before this word can properly be used there must be knowledge of what the defect consists. A defect must be known as a definite entity or where not so known, should be qualified as a supposed defect. The reiteration of this word eventually creates the impression that there really is a defect in the steel, when as a matter of fact the most diligent search has failed to reveal any. If a defect, perchance, is identified a long step will have been taken toward its possible rectification or if not admitting of elimination its irremediable character will become established. When a defect is mentioned it is incumbent upon the assertor to describe it, if called upon to do so. The inadvertent use of this word has doubtless been largely responsible for the current impression that some remedial feature in the manufacture of steel is the precursor of a transverse fissure, the knowledge and neglect of which places the responsibility upon the steel maker for the prevalence of this type of fracture. This trend of thought runs through practically every general discussion of the subject. The matter of ultimate resistance of the steel and relations of the service stresses to it does not come up for consideration, hence no definite conclusions are reached, nor can there be any.

The Bureau of Safety of the Interstate Commerce Commission has published reports of accidents due to

transverse fissures from time to time since the report upon the Manchester accident. Other reports are now in progress, including the Victoria accident. Nine reports have been printed on this type of fracture and copies thereof widely distributed. Different phases of the subject have been covered by these reports which are believed to have presented a comprehensive statement of the formation of this kind of fracture. In addition, the Bureau of Safety has prepared and published an extended description and compilation of the prevalence of transverse fissures on different railroads, showing the places where some eight thousand transverse fissured rails were located, according to mile posts. The activities of the Bureau on this matter have neither ceased nor have they been suspended. They are being continued along directions beneficial to all.

In your editorial the demand is made to "Throw aside prejudices, cease mutual efforts to place responsibility upon the other party; engage in a joint scientific study to determine beyond question the cause of transverse fissures and the measures which must be taken to eliminate them; * * * the repetition of such accidents as Victoria serves as an indictment of our metallurgical talent."

Nothing has taken place during the past 14 years to change or modify the views expressed in the first report issued by the Interstate Commerce Commission on this type of fracture, in which it was described, and the definite cause for its development given; namely, high wheel loads, which of course are aggravated by high speeds. Hope for improvement lies in the direction of finding a steel having a higher limit of endurance against present track strains, one which has a margin above any known grade of steel familiar to the arts. There is no hope for immunity against the display of transverse fissures in present track structures exposed to current strains.

A state of finality undoubtedly admits of being reached in the endurance of steels. If judgment is at fault in the belief that the prevention of transverse fissures under present wheel loads on present grades of steel is impossible, a great service will be performed by any person who will present conclusive evidence which will correct that judgment.

W. P. Borland,
Director, Bureau of Safety, Interstate Commerce Commission.

"Railroading—Is It a Worthy Occupation?"

Des Moines, Iowa.

To the Editor:

Is there not some way whereby your editorial "Railroading—Is It a Worthy Occupation?" can be placed in the hands of every young fellow in the railroad world?

A greater realization of the importance of the railroads with respect to the development and growth of our country should be an incentive for every railroad employee to work just a little bit harder and perform his particular duties more efficiently. Every person, whether he be in the engine cab or in the caboose, on the track, in the shop or roundhouse, or in the office, should realize that he is a cog in a huge, important machine and it is necessary for him to function properly at all times, because, regardless of how apparently unimportant he is, he must remember that a chain is no stronger than its weakest link.

The young man taking employment with a railroad today should realize, that as from the younger generation as a whole will come the future executives of our nation, so will the railroads look to their junior employees to operate and manage their properties tomorrow. The rapid development of our country and the demand for more capable transportation facilities to handle the increased volume of business incident thereto has placed many intricate problems before the railroads, so that railroading today is more than an occupation—it is a profession, and it might even be said that it is an art, for to my mind, to be a real, honest-to-goodness transportation officer nowadays, is an art.

For the young man who is seeking to establish himself in some line of endeavor where he can use the greatest amount of recognizable initiative, he need go no farther than the right-of-way, and once he is so established, he should uphold the dignity of his profession and keep in mind at all times the obligation which he has directly or indirectly assumed, to do his bit toward fulfilling the promise of his railroad as a common carrier.

With these thoughts in view, the young railroad man of today need have no fear as to his inability to gain recognition from his superior officer.

D. Berman,
Secretary to General Manager, C. R. I. & P.

A. E. R. A. Offers Aid in Meeting Bus Problem

New York.

To the Editor:

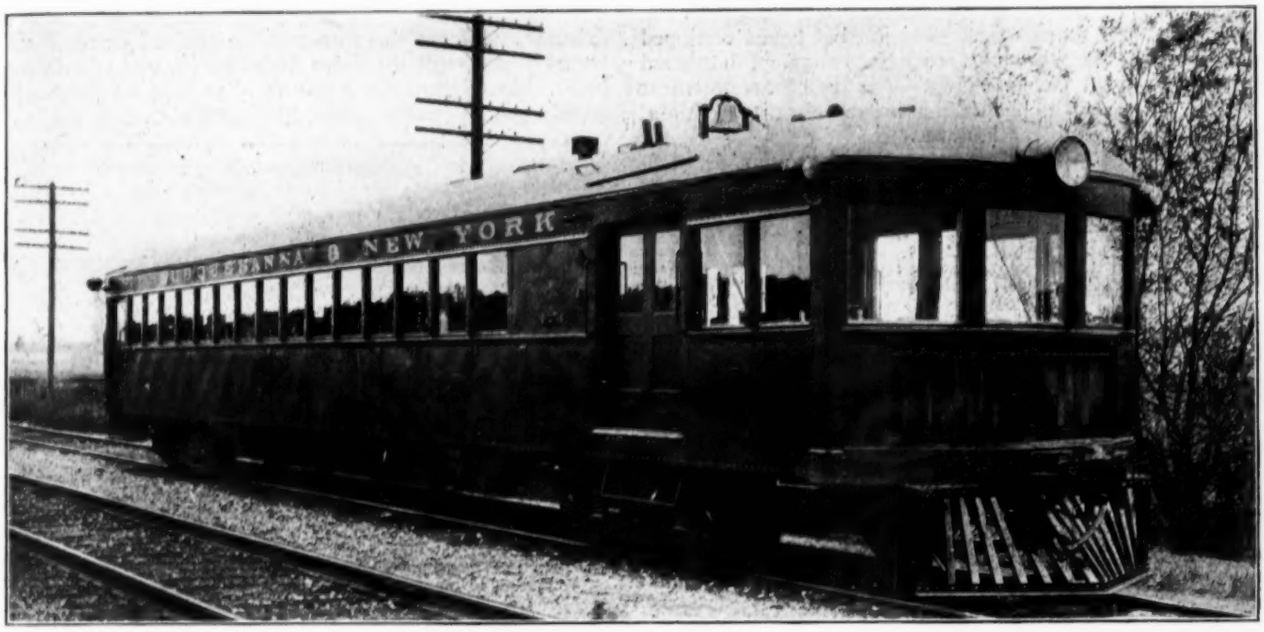
I have been very much interested in your comments on "Motor Bus and Truck Transportation" in the *Railway Age* of December 5, in which you emphasize the necessity of the steam carriers considering the important questions that are arising concerning the relations between rail and motor transportation. I agree with you that "it is a proper function of the *Railway Age* to make itself a clearing house for information regarding all railway problems, including those concerning the relations between rail and motor transportation."

My interest in your announcement is keen because of the fact that the electric railways were the first common carriers to feel the effects of motor vehicle competition. For the last ten years the electric railways have had to solve new problems created by increased use of individual transportation units and the development of buses.

Since the decision of the Supreme Court of the United States last March to the effect that the states do not have the power to regulate buses in interstate commerce, there has been a heavy development of interstate bus traffic. While this has affected the electric railways somewhat, I believe it has been more menacing to the steam carriers. This interstate service presents a new problem to the steam roads, as well as to the electric railways and the states. The situation will be brought to the attention of the present Congress and it is to be hoped that legislation correcting the present conditions will be enacted.

I am not sure how well informed the steam railroads may be as to the vast amount of information on the subject of motor vehicle operation that has been accumulated by the American Electric Railway Association. I do not know of any other organization in the country so well equipped to give authoritative information on this subject as the American Electric Railway Association. At the convention of the Association last October, its constitution was revised, provision being made in the revision for membership at a very low fee of steam railroads that are interested in the same problems as the electric railways. I would thank you for the opportunity to extend to the steam roads an invitation to avail themselves of the benefits of our information service. I offer this suggestion in a spirit of helpfulness, for as time goes on the problems common to the steam roads and the electric railways increase in number and importance.

Lucius S. Storrs,
Managing Director, American Electric Railway Association.



Mechanically-Driven Rail Car Built for the Susquehanna & New York by Smalley Rail Car Company, Davenport, Iowa

New Gasoline Rail Car Developed

Susquehanna & New York acquires mechanically-driven car which adheres closely to railroad standards

A NEW gasoline rail car, designed to conform so far as possible in mechanical details as well as general appearance, equipment and interior finish to the best modern steam railroad practice, has been developed by the Smalley Rail Car Company, Davenport, Ia. The first car of the new design was recently completed and delivered under its own power to the Susquehanna & New York at Williamsport, Pa. It contains main and smoking compartments with a combined seating capacity for 50 persons, a 19-ft. 8-in. baggage compartment, enclosed vestibule and toilet, and is intended to handle a trailer in regular service.

Interior View of Car Looking Toward the Smoking Compartment and Baggage Room

The car, which is 60 ft. long and weighs 61,000 lb., is mechanically driven to the inside pair of wheels of each truck from two four-cylinder, 75-hp. Climax gasoline motors placed side by side at the front of the car and independently clutched to a common gear box, permitting the car to be driven by either or both motors at the will of the operator. This tends to promote reliability of operation since, in case of mechanical trouble with either motor or with either truck, the defective unit can be disconnected quickly and the run completed on the remaining drive. Except for quick acceleration and for negotiating heavy grades, less than half the maximum power is required to operate the car, thus assuring the economy which will result from operation with only one motor a considerable proportion of the time.

The Smalley rail car is of all-steel construction. The body, of the single arch roof type, is built with an exterior of 12-gage steel and interior trim of solid mahogany with ceiling of agasote. It is mounted on an underframe consisting of four, 6-in., 10½-lb., channels with built-up bolsters and end sills. Liberal bracing and cross ties are provided to assure rigidity and maximum resistance to the weaving action of the car on the curves and relatively rough track encountered in branch line service.

Special attention has been paid to the truck design, each truck frame consisting of a one-piece Commonwealth steel casting with pedestal jaws and end transom for the drive housing cast integral. The truck bolsters are offset on a 60-40 ratio so that 60 per cent of the car weight and pay load is on the drivers at all times. Rolled steel wheels 30 in. in diameter are pressed on 4-in. carbon

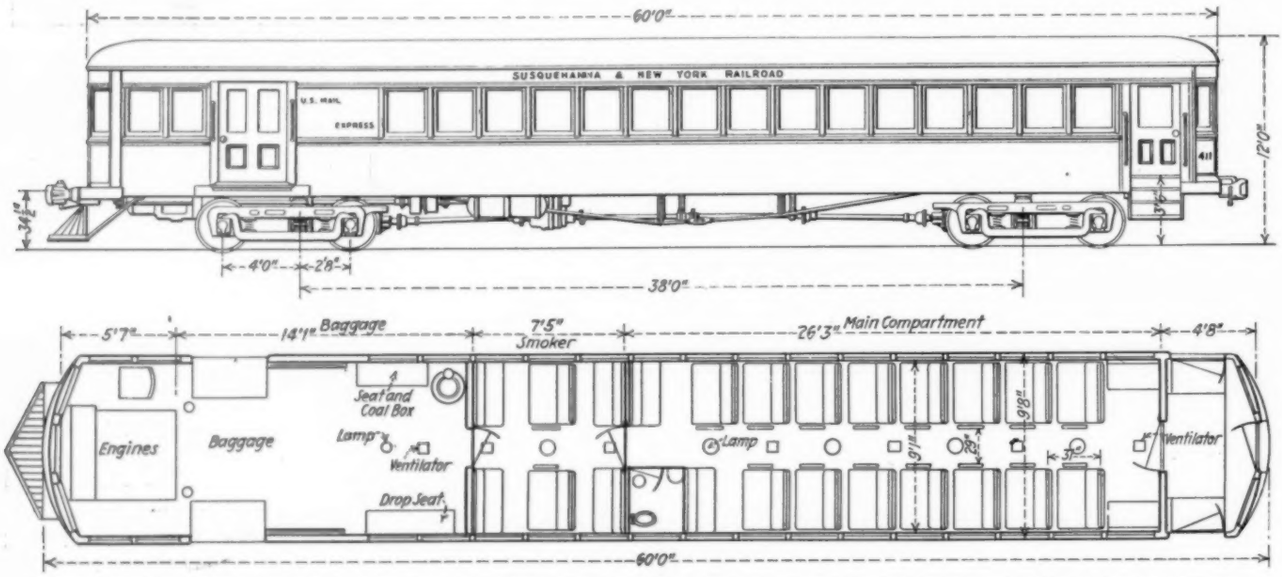
vanadium steel axles. Cast steel journal boxes equipped with two Timken bearings each bear against hardened steel shoes in the pedestal jaws. The spring arrangement has been designed to assure maximum comfort in riding, especially on rough track.

A 32-volt lighting system, fed by a 120 amp. hr. storage battery, is provided. The 1-kw. generator, furnished by the Safety Car Heating & Lighting Co., is driven directly from the engine shaft. The lights are on two circuits so that one-half of all the lights can be used at will. Marker and classification lights and the headlight are each independently controlled. The 12-in. golden glow headlight, of 250 candle power, is built into the car body at the letter band height and has adjustment as to direction. It can be dimmed by means of a switch within easy reach of the operator.

The car is designed with a special view to being cared for in service by railroad men. United States standard threads are used on all bolts and cap screws. In case of heavy engine repairs provision is made for the ready removal of either engine and the substitution of a spare unit without the loss of a run. A feature of the engine drive shafts from the transmission connect through universal joints with the drive housings on each of the two inner axles. Here the direction of motion is changed by large capacity mitre gears, the final drive of the axle being by hardened 7½-deg. helical gears of three pitch and 5-in. face. Mechanical efficiency is increased by the liberal use of anti-friction bearings, 54 of which are used in the car. There are 42 Timken roller bearings to carry the shock loads and 12 ball bearings to reduce friction at other points.

SPECIFICATIONS OF THE CAR

General Dimensions:		
Length over end sills	60	ft.
Width over posts	9	ft. 8 in.
Length of baggage compartment	19	ft. 8 in.
Seating capacity of passenger compartment	50	
Seats in baggage compartment for	7	
Seat length	40	in.
Width of aisle	29	in.
Truck centers	38	ft.
Truck wheel base	6	ft. 8 in.
Diameter of wheels	30	in.
Height from rail to top of roof	12	ft.
Height from rail to floor	42	in.
Coupler height	34½	in.
Weight of car	61,000	lb.
2 Climax motors (75 hp. each)	5½ in. x 7 in.	cyls.



Floor Plan and Elevation of the Smalley Rail Car—The Engines, Transmission Truck Centers and Offset Are Indicated

control is its simplicity. All the functions of starting, stopping or clutching in the engines are performed by means of a single lever so arranged that the different acts cannot be carried out in the wrong sequence. The engines are kept in step by a synchronizer designed to prevent racing when the second engine is started up or de-clutched. Twin disc type clutches are used.

Another feature is the construction of the two radiators of sectional cores removable from the front of the car. In case of injury any section can be removed and a spare section quickly substituted.

Flexibility and wide range of speeds is provided in the transmission. Four primary speeds are available in each of three ranges, the highest speeds forward and in reverse being 63 miles an hour and 48 miles an hour respectively. These speeds are obtained at an engine speed of 1150 r.p.m. The transmission is located at the rear of the forward truck and drives to both trucks, gear changes being made by means of sliding keys.

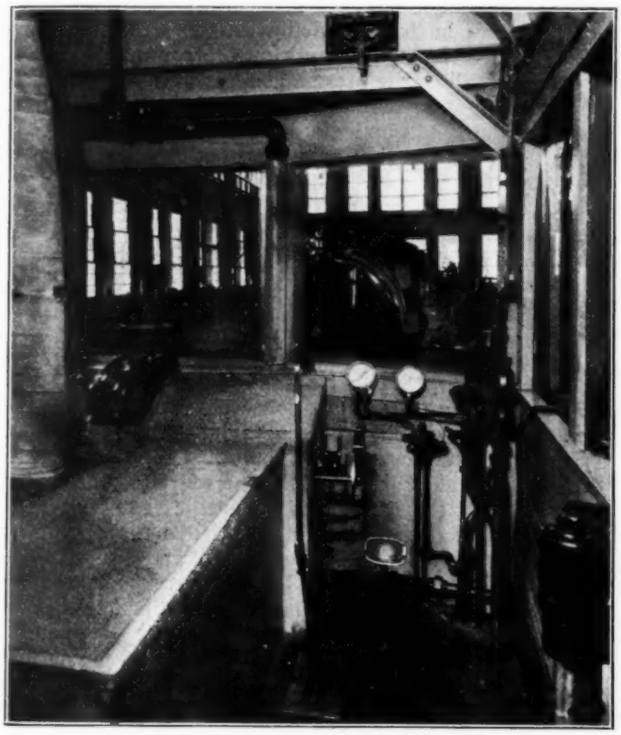
A patented over-run drive arrangement eliminates the power loss due to uneven rolling of the wheels of two driving axles when connected by a rigid power drive. Tabular

Positive lubrication is provided to all bearing surfaces. The engines have drilled crank shafts with force lubrication, indicated by pressure gages in plain view of the driver. The transmission and axle drive units have plunger oil pumps supplying all moving parts with a continuous flow of oil which cuts down friction and gear noise. This system permits the use of light oil in place of the usual heavy grease and make a material reduction in frictional resistance, especially in cold weather. The journal boxes use light oil and are provided with oil slingers to utilize practically all the oil before the bearings suffer for lack of lubrication.

Straight and automatic air brake equipment is provided, of the Westinghouse A. M. M. type. The engineer's valve is at the right of the driver and there is a conductor's valve in the rear vestibule. A 12 to 1 ratio hand brake with drop handle is located convenient to the driver. Two 12-in. by 6-in. brake cylinders furnish braking power, one to each truck, operated by a common triple valve. This arrangement is said to save 500 lb.

in the weight of foundation brake rigging and is a safety feature since either truck brake will hold the car.

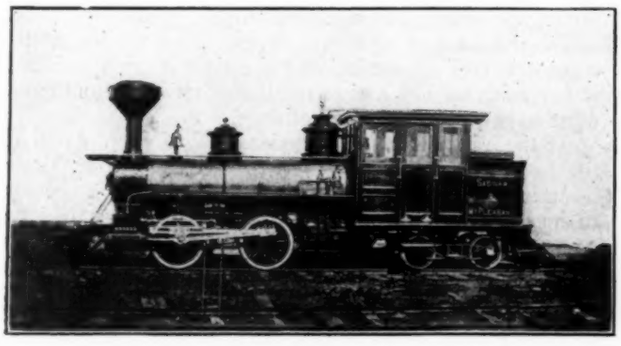
A 50-lb. locomotive type bell is located forward on the car roof as is also a Strombos horn. The Westinghouse air compressor of 12 cu. ft. capacity is driven directly from an extension to the engine shaft. The car is heated by a Peter Smith hot water heating plant located in the baggage room, aluminum radiating coils being used in the passenger compartment. Copper coils connected with the heating system are placed in the engine radiators for use in extremely cold weather. Both ends of the car are



View Showing Location of Controls for Both Engines—Air Brake Valve and Headlight Switch at the Top

supplied with automatic couplers of M. C. B. dimensions but light weight. The rear couplers are equipped with draft gears for trailer hauls.

The Susquehanna & New York car left Chicago over the Pennsylvania, making the trip to Williamsport, Pa., without the addition of water or the necessity of any adjustment. It is said to have run from Gary, Ind., to Crestline, Ohio, 253 miles, in 6 hrs. 23 min. including a stop of 20 min. to take on fuel at Van Wert, Ohio.



Built 1879—3 ft. gage

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended December 12 amounted to 1,008,824 cars, an increase of 51,400 cars as compared with the corresponding week of last year and an increase of 109,067 cars as compared with 1923. This was the 20th week this year in which loadings have exceeded the million-car mark and the second time on record in which that mark has been exceeded in December. The loading for corresponding weeks in the two preceding years was exceeded in all districts except the Northwestern, where there was a slight decrease as compared with 1923, and in most classes of commodities. Livestock showed a decrease as compared with last year and 1923 and coal showed a slight decrease as compared with last year. Grain and grain products loading showed an increase of 5,910 cars as compared with last year and miscellaneous freight showed an increase of 34,577 cars as compared with last year and an increase of 57,969 cars as compared with 1923. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

REVENUE FREIGHT CAR LOADING—WEEK ENDED DECEMBER 12, 1925

Districts	1925	1924	1923
Eastern	222,609	220,773	220,764
Allegheny	199,174	188,885	186,325
Pocahontas	59,716	50,350	36,745
Southern	165,263	150,607	135,545
Northwestern	117,764	115,723	118,013
Central Western	165,194	155,122	141,708
Southwestern	79,104	75,964	60,657
Total Western	362,062	346,809	320,378
Commodities			
Grain and grain products	58,552	52,642	50,670
Livestock	37,415	43,240	40,800
Coal	191,884	192,394	176,128
Coke	16,391	11,313	11,312
Forest products	72,211	71,853	67,381
Ore	12,540	11,621	11,090
Mdse., l.c.l.	259,389	248,296	239,903
Miscellaneous	360,442	325,865	302,473
Total	1,008,824	957,424	899,757
December 5	1,020,873	969,485	913,921
November 28	923,213	879,131	835,081
November 21	1,057,674	1,010,919	990,299
November 14	1,050,758	1,016,843	992,050
Cumulative total 50 weeks	49,508,997	46,986,455	48,319,067

The freight car surplus for the week ended December 7 averaged 159,897 cars, an increase of 23,101 cars as compared with the week before. This included 54,277 coal cars and 69,292 box cars. The Canadian roads for the same week had a surplus of 7,270 cars, including 4,500 box cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended December 12 totalled 69,449, showing a seasonal decline of 3,159 cars from the previous week. Grain loadings continued heavy, that week being the sixth consecutive week and the ninth week this year exceeding 20,000 cars. Car loading showed a revival with 7,660 cars. Compared with the same week last year there was an increase of 14,545 cars, grain accounting for 10,247 cars.

	Total for Canada			Cumulative Totals to Date	
Commodities	Dec. 12, 1925	Dec. 5, 1925	Dec. 13, 1924	1925	1924
Grain and grain products	20,249	21,331	10,002	480,837	473,493
Live stock	2,975	3,087	3,645	123,838	121,865
Coal	7,660	6,731	6,446	230,389	278,692
Coke	469	488	297	15,543	11,976
Lumber	2,867	3,167	2,951	176,093	179,017
Pulpwood	1,641	2,196	1,581	123,605	120,765
Pulp and paper	2,302	2,493	2,161	103,177	98,412
Other forest products	2,703	2,424	2,247	140,332	126,885
Ore	1,319	1,317	1,050	71,141	62,854
Merchandise, L.C.L.	15,835	16,277	14,505	765,729	731,109
Miscellaneous	11,429	13,097	10,019	648,036	609,581
Total cars loaded	69,449	72,608	54,904	2,878,720	2,814,649
Total cars received from connections	34,320	34,177	32,405	1,662,947	1,573,692

I. C. C. Appointments in Senate Controversy

WASHINGTON, D. C.

PRESIDENT Coolidge and administration leaders in the Senate have been considering for some time a plan for increasing the membership of the Interstate Commerce Commission from 11 to 12 or more members, to make it possible to appoint a commissioner from the South, and thus remove a source of agitation which has been growing for several years. Also to eliminate much of the opposition in the Senate to the confirmation of Thomas F. Woodlock, who has been serving under a recess appointment, and partly on the theory that more commissioners are needed to handle the work of the commission.

While the plan was still under consideration, however, Commissioner McChord called at the White House on December 17 and submitted his resignation. This was announced at the White House on December 21 when the President nominated Richard V. Taylor, formerly vice-president and general manager of the Mobile & Ohio as his successor. The President at the same time sent to the Senate the nomination of Mr. Woodlock. Some surprise had been expressed when this was not sent at the same time as the nomination of Ernest I. Lewis for reappointment last week, but it was explained at the White House on Friday that the President expected to appoint Mr. Woodlock but was waiting to see what could be done about the new plan to provide a new commissioner. It was stated that he would approve a bill for that purpose and would be glad to appoint a man from the South. At the time he first appointed Mr. Woodlock it was stated at the White House that the President was in sympathy with the desire of the South for representation but that he felt at that time that the commission particularly needed a financial man to succeed Mark W. Potter.

At a meeting of the Senate committee on interstate commerce on December 19 the Senators who are for the Gooding long and short haul bill outvoted those who desired to have the committee hold hearings on the Cummins consolidation bill ahead of those on the Gooding bill and it was decided to begin the latter on January 6. As extensive hearings were held on this subject at the last session it is planned to devote only a day or two to the new Gooding bill. Chairman Watson was authorized to fix a later date for the beginning of hearings on consolidation and hearings on the motor regulation bill will follow. The committee voted favorably on the confirmation of Commissioner Lewis of the Interstate Commerce Commission for reappointment and also discussed to some extent the plan to increase the membership of the commission, differing as to the number of new commissioners to be added.

No definite statement was forthcoming as to whether Commissioner McChord, by bringing forward his resignation at this time, had caused an abandonment of the plan to increase the number of commissioners, but the inference was drawn that it would be dropped, although it remains to be seen whether the nomination of a former railroad officer from Alabama would satisfy the Senators from the South Atlantic States or the Southwest and there were many indications in the debate which ensued in the Senate that a good deal of opposition still exists both to Mr. Taylor and to Mr. Woodlock, and that an effort to pass a bill would bring out an effort to provide for regional representation in the commission. Mr. Woodlock's confirmation was held up at the last session by a combination of the Progressives, who criticised the appointment of a man who had spent so many years in Wall Street, with many of the southern Democrats who have long been demanding the appointment of a southern man and who have put forward many candidates. It was thought by some of the Republican leaders that the appointment of a southerner would remove some of the latter from the list of opponents of Mr. Woodlock but in the debate in the Senate they vigorously denied a suggestion by Senator Blease of South Carolina that any "deal" had been made with the Democrats. He said that if any such deal had been made he wished to deny that Senator Smith, who had gone home for the holidays, had had anythink to do with it. Senator Underwood of Alabama also denied that any deal had been made, saying that for several years he had pleaded with the Presidents for a representative from the South on the commission, on the ground that all of the present commissioners live north of a line drawn from Baltimore to San Francisco, leaving 16 states in the South and more in the West without representation. He said that nearly a month ago the President had told him he expected a resignation and had asked him to suggest a man from the South. He had suggested the name of Mr. Taylor, now mayor-commissioner of Mobile, and later the President had asked him to bring Mr. Taylor to the White House and had also asked if he was acceptable to the other Senator from Alabama, Mr. Heflin. Mr. Heflin had said he was heartily in favor of him, but Mr. Underwood said the President had made no promises and he had not known that he was to be appointed until the nomination was sent to the Senate. Senator Underwood said that at the time of the last vacancy on the commission before President Harding died the President had said that he regretted that he was committed to the man whose name he then sent to the Senate and had assured him that when the opportunity came he would give representation to the South.

This led to a discussion of the question of the geographical selection of commissioners. Senator Reed of Pennsylvania said that although that state originates 20 per cent of the traffic of the United States it has never had a representative on the commission. Senator Bruce of Maryland said he had announced that he would not vote for a bill such as that introduced by Senator Smith to provide for geographical representation. Senator Swanson of Virginia suggested that the commissioners should be chosen according to rate-making districts. Senator Harrison of Mississippi suggested that his state had no representative on the commission. Senator Wheeler of Montana stated that his opposition to Mr. Woodlock was not because he was not from the South but because of articles he had written in the Wall Street Journal. Senator Heflin spoke favorably of Mr. Taylor and said he had joined the opposition to Mr. Woodlock only because he was not from the South but denied that he had been a party to any "deal." Senator Cummins gave an argument against the idea of appointing commissioners geographically but said he thought that the South was entitled to a commissioner.

The debate was continued in executive session and the nomination of Commissioner Lewis for re-appointment was confirmed but action on the other two nominations went over until after the holidays.

At the White House on Friday it had been stated that the President was not in favor of specific regional representation and that he did not think it would be necessary to increase the commission to 13 members, as had been suggested. In this connection it was pointed out that vacancies are constantly occurring and that an opportunity might soon present itself to appoint a man from some other part of the country. Senator Watson, chairman of the Senate committee on interstate commerce, had suggested that the commission be increased to 15 members.

The Economics of Railway Labor*

The fundamental principles of a program to raise maintenance forces to highest efficiency

By C. C. Cook
Assistant Engineer Maintenance of Way, Baltimore & Ohio, Baltimore, Md.

APPROXIMATELY 21 per cent of all railroad employees, numbering in excess of 400,000 men in the United States, are variously engaged in the maintenance of roadway, tracks, bridges, signals, shops and other structures constituting the fixed property of the roads. Their work is done in widely scattered areas, frequently without immediate supervision and generally without that close supervision that is possible in manufacturing plants, shops and other industries where all operations are under a single roof or in prescribed area.

Main Elements

What are the elements of the problem? There is the work to be done and the organization provided for its accomplishment; this includes both the men who actually labor in carrying out the programs of work and the men who design, plan and chart the orderly procedure of the operations. To attain economy complete harmony of understanding of the duties, rights and obligations of all these men is essential.

For the men who actually accomplish the work the items of most compelling interest always will be the wages and working conditions. Any plan for improvement in economy that ignores these two items is headed for destruction; any that considers them only is equally bound for obliteration; the immutable law of balance between supply and demand will ultimately wreck the most carefully laid plan for unfair advantage for any group.

As a result of economic developments of the past decade, these railroad employees are, all things considered, on a par with the employees of like crafts in other industries. Their wages and working conditions are stabilized and fluctuate only as the rise and fall in the cost of the products of the nation make more or less permanent and pronounced change.

Our study of improved economies presumed a satisfactory adjustment of those items and thereafter passed at once to a consideration of those other features which appeared most important. In the order of their investigation they were: (1) The methods for obtaining satisfactory employees; (2) the means for retaining in service satisfactory employees; (3) the training and education of employees, (a) those in the engineering department in maintenance work for ultimate control of the planning, designing and control of operations, (b) those, other than engineers, for greater economy and efficiency as well as their own promotion; (4) the establishment of means for stabilizing maintenance of way work so that as far as possible work for all the year round will be provided; (5) the methods of programming maintenance of way work in the interest of efficiency and economy; (6) the provision of sanitary and agreeable living conditions for employees who are enforced by the character and location of their work to occupy improvised quarters; (7) the establishment of standards and units of measure for all work performed which is susceptible of measurement; (8) the adoption of labor saving devices.

Many of the features pertaining to this outline of investigation will be recognized as being in universal association with all industry and, as in numerous instances, they were more readily applied in outside industries an investigation of the practices and results in companies or works which were outstanding in the benefits they had secured was undertaken. I will not attempt to review the advances made by some of these industries in the development of their special plans for they are of such wonderful variety and unique results as to constitute almost a revolution of the industry wherein they were made operative. An instance of the high point in their development that has been attained is evidenced by the plans of the manufacturers of one well known national product who have established "guaranteed employment" of 48 weeks per year to every employee after six months' service and have in addition thereto established an employees' stock participation plan with employee representation on the board of direction that has resulted in a wonderful esprit de corps and marked co-operation for productivity.

The place that these items have in the railroad industry is stated in the following conclusions adopted by the committee and the association to which I have referred:

"(1) In order to retain satisfactory employees, railway managements should provide means for the fullest possible co-operation between employer and employee, arranging for the education of all employees and particularly those in a supervisory capacity in the aims of the companies to secure that result.

"(2) Where roads are of sufficient size to warrant the creation of a personnel department, we recommend that such a department be established whose duties shall be the encouragement of employees and their handling without prejudice, in their (a) employment, promotion and transfer; (b) education, training and service, including separation from service. On smaller roads work of the character above outlined should be assigned to some officer in the existing organization, to be handled independently of his relation to any particular department.

"(3) The adoption of a plan of employee representation in railway work will, through the improvement of the spirit of co-operation, serve largely to stabilize labor and reduce the problem of obtaining new employees.

"(4) The extension of benefit associations providing insurance against the hazards of sickness, accident, superannuation and death is essential to the development of a loyal and co-operative spirit in railway organizations, which is needed to assist in the work of stabilizing labor and render it more efficient and economical. Savings funds and loan provisions placed at the disposal of all worthy employees are an added incentive of merit and of economic value.

"(5) The promotion of the mutual interests of employers and employees through participation in the ownership of the industry on which they are dependent for

*A review of the work of the Committee on Economics of Railway Labor of the American Railway Engineering Association, presented before the St. Louis Railway Club on December 18. Mr. Cook is chairman of the committee.

their income in wages or dividends is an objective greatly to be desired and warrants the careful consideration of the railways as a means of stimulating co-operation in the common objective.

"(6) Plans for the establishment of satisfactory working conditions, including the provision of sanitary and agreeable facilities while on duty, comfortable rest-houses, rest-rooms and dining rooms, maintained in clean condition, and service of a sufficient quantity of wholesome food, should be in effect on all roads.

"(7) The establishment of standards and units of measure for all work performed, which is susceptible of measurement, is a fundamental basis of harmonious understanding between employer and employee and the foundation for economical and efficient handling of labor."

Stabilization of Employment

The proposal to stabilize maintenance of way labor so that employment throughout the year will be assured is one that promises most immediate and beneficial results. Every man, despite his station in life, is striving for that contentment which comes from security in his business affairs. When as in the case of workmen it is entirely dependent upon their physical effort none can fail to understand its appeal to them. From the standpoint of management it beckons equally as strong. The industrial activities of the country and the railroads as well have been shot through with the extravagance resulting from labor turnover with all of its evils of disrupted work, inexperienced men, disloyalty and inefficiency.

Great strides have been made in the improvement of the situation. Larger opportunities are lying just ahead. Fortunately in railroad maintenance of way work there is but minor economic reason for fluctuation of force. Only one-third of all maintenance of way expenses are affected by the variation in use made of the property. Two-thirds of the expense would be needed for maintenance, irrespective of traffic fluctuation. The necessity for any considerable variation in force should arise only from the climatic conditions. Neither in the extraordinary demands of the work nor in the need of economic performance is there a call for other than a uniform force of trained employees the year round.

Recognition of this condition is reflected in an order of the Interstate Commerce Commission which permits the carriers of the United States to make uniform monthly charges during each of the 12 months of the year, irrespective of the varying amounts actually spent per month. It only is required that the total for the year be equivalent to the total budget figures prepared in advance or as revised through necessity during the course of the year. There is ample latitude in this provision to enable any railroad to dispose of its maintenance force throughout the year as it deems best without the necessity of variation to meet monthly fluctuations in traffic which of itself but slightly change the physical maintenance requirements.

The more practical consideration of determining the kind and quantity of work now done during the summer which could be done with equal or greater economy during the winter is one to which our committee is addressing itself. It is commended to all the roads for thorough analysis and revision of practice for the purpose of giving greatest possible stability to force and securing the fruit of that effort—the maximum of economy in results.

A remarkable change with this effect has been made by railroad in recent years. In the item of rail laying, there has developed a transposition for the season of its accomplishment. Formerly the common practice was to wait until the spring or summer period, at which time all other major items of track work were being put under way. As a result force restrictions, traffic density and material shortages caused excessive waste of effort and inefficiency. With the adoption of the policy of laying rail during the winter, which is possible generally in this temperate zone, the regular force is combined to complete this productive work during the winter months when they otherwise would either not be employed or else be used on work which is unproductive and probably not essential. The net result is that almost the entire cost of doing work of that character can be considered a saving.

There are many items of maintenance work that can be thus transposed, such as widening embankments, tightening bolts, tie plating out of face, distributing cross ties and switch ties, inside work on structures, curing soft spots in roadbed, fencing, etc., the total of which will greatly provide for the uniform distribution of force so much to be desired.

Programming Maintenance of Way Work

As a corollary of the preparation of a budget and the distribution of expense which will provide for as nearly a uniform force as possible during the entire year, there are needed carefully outlined and definite programs of work. These should be based on the system requirements but should also be prepared and carried out on the divisions. The committee's recommendations in this respect were:

"The orderly prosecution of maintenance of way work throughout the year is essential to its most economical conduct. It is promoted by:

"(a) The preparation of a budget of the work to be done during the year and the authorization of this budget for the year, if possible, or quarterly at least, sufficiently in advance of the inauguration of the work to enable materials and men to be collected in an orderly manner.

"(b) The equalization of expenditures on roads where it is practical in accordance with the plan authorized by the Interstate Commerce Commission to eliminate the wide fluctuations in expenditures from month to month.

"(c) The preparation of a detailed program in which the work authorized is scheduled so that it may be done at the most economical season consistent with the most efficient utilization of forces.

"(d) The carrying of this program down to the local division and to the individual gangs on those divisions in order to enable the work of these men to be directed to the best advantage."

Living Facilities

The need for maintenance work in both isolated and congested territory where living facilities are not readily available makes necessary the provision of housing facilities for the temporary accommodation of employees assigned to those regions. The time has passed when large numbers of men can be grouped in cramped quarters without the conveniences needed for healthful living. Not only the conveniences that make for sanitation of camps are now provided, but many features of entertainment which are part of this modern period are installed. They exert a profound influence in increasing the morale of these workmen,—an item of intangible but yet incalculable value in securing efficiency of effort.

Standard Methods and Units of Measure

The widely ranging area of maintenance of way work is matched only by the diversity of items that constitute its program. Railroad managements have been compared to their disadvantage with other industries whose methods were standardized and whose individual operations were measured on a unit basis.

Our committee early made extensive investigation of

standard methods for performing maintenance of way work for the purpose of establishing units of measure of performance and is continuing its study along that line to determine as far as possible units of measure of performance of maintenance operations.

Comparisons of performances are as valuable to foremen as they are to managers in securing economical results. The foreman who so arranges his gang when possible as to have each man or each pair of men assigned to a half rail length of track, directing them as to the best method of doing the work and inspiring them to equal or to exceed a standard of performance, will invariably secure greater efficiency. The management which has developed and made effective the best methods of doing the various items of work and uses all the data on unit performances it is possible to develop for comparing results from gangs, sub-divisions or divisions, will in proportion secure the greatest economy in results.

A well defined plan of making such an application of methods to track work was presented by our committee, received the approval of the association and is a part of the record in its manual. It is to be commended to the roads for their serious consideration and application in the effort to develop full economy in track labor.

Labor Saving Devices

The last item to be discussed, but not the least in this day of restriction of immigration and other inroads upon the unskilled labor market, is the use of labor saving devices. It may be thought that labor itself is not in sympathy with the substitution of such devices for the products of their hands. A little reflection of our situation will show the fallacy of that opinion. In the first place those devices, large and small, are aids rather than substitutes, and are welcomed as such. Men who are asked to maintain satisfactorily a given mileage of track clamor for those devices which relieve them of such laborious work as excavation in ditches, cleaning stone ballast and handling rail weighing from 100 to 150 lb. per yard, all of which can be done many times as rapidly and with but a small percentage of manual effort by the use of ditching machines, locomotive cranes and rail laying machines. The smaller tools of recent marketing such as the portable rail saw, the track liner and ballast screen which enable one man to accomplish with less effort more than two to five men can accomplish with hammer and rail cutter, lining bars and forks are equally desired. Their use enables the force to spend just that much additional effort in the renewal of materials that cannot be thus handled and in the maintenance of the degree of excellence in track line and surface demanded by present day traffic. Every encouragement is to be given to those who have the vision and the initiative to conceive, design and market any device that promises economy in maintenance.

Summary

The outline I have attempted to give is inadequate to even suggest the magnitude of the subject. There has been no desire to criticize the record of the past or to assign unfair responsibility for the improvement of the future which is inevitable. Men and management have an equal responsibility to continue the development of harmony in their relations and in the direction and performance of work essential to the true economy of railway labor.

There need be no visions of a millennium of harmonious effort and 100 per cent efficiency, but if those in authority will continue their practical analysis, and the application of the data and knowledge thus made available, and the men will co-operate in the effort which in the fruition will result in advantage to them as well as to economy for the roads, there will be at least a continuation of the progress that has made the unhampered railroads of America the most efficient transportation system the world has yet produced.

New York Railroad Club Annual Dinner

THE New York Railroad Club held its annual dinner at the Hotel Commodore, New York, on December 17. The dinner celebrated the fifty-second anniversary of the club. Approximately 3,000 members and guests were in attendance.

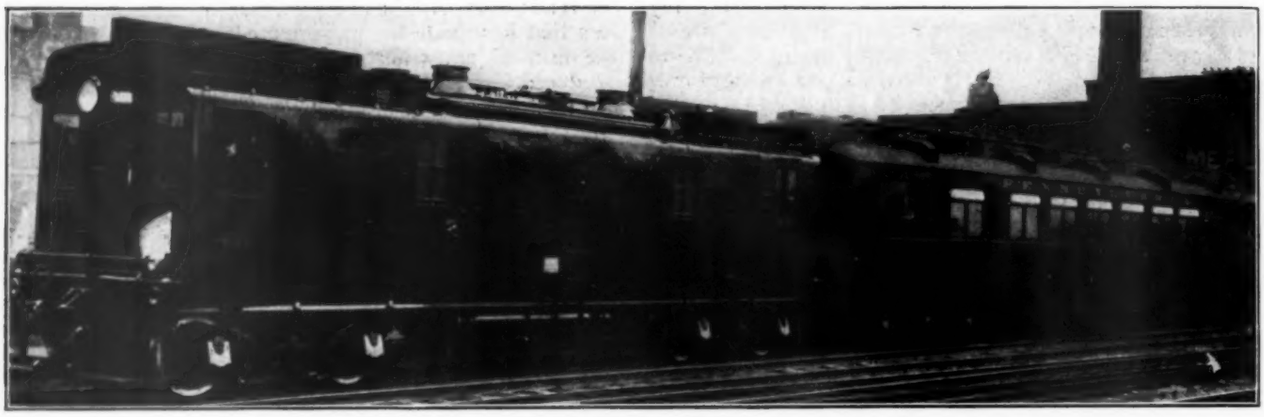
W. F. Jones, general storekeeper of the New York Central, West Albany, N. Y., the president of the club, served as toastmaster. The principal speaker of the evening was Dr. Charles Alexander Richmond, president of Union College, Schenectady, N. Y. The subject of his address was "Fellowship"; it was a plea for better human relations, not only in industry but nationally and internationally as well.

An elaborate program of entertainment was provided, which included songs and humorous sketches by a group of entertainers and a serio-comic address by "Senator" Ford, the humorous speaker. A special feature of the program was the moving picture "close-ups" of "Our Presidents," which included not only prominent railway executives from Eastern territory, but leaders in the railroad supply industry and other prominent members of the club as well. Moving pictures were also shown of athletic events held by various railroads in recent months.

Decorations were elaborate and the railroad theme was carried in them throughout. Entrances to the ball-room of the hotel where the banquet was served were made to resemble station platform gates—half exact replicas of those in Grand Central Terminal, New York, and the other half similarly accurate reproductions of the gates, with train announcers and all, of the Pennsylvania station. Hotel employees were garbed as dining car waiters, red cap porters, gatemen and trainmen. On each table with the standard which bore the table number was a trainman's lantern, alight, with a red or green globe. Over the speaker's table was a New York Railroad Club banner with dates in the form of an electric sign, on either side of which a silken American flag in a spotlight's glare waved in an artificial breeze from an invisible source.

David W. Pye, president, Tuco Products Corporation, was general chairman and Arthur N. Dugan, vice-president, Bronze Metal Company, general vice-chairman of the general committee on arrangements. Other committee chairmen were as follows: James S. Doyle, assistant to general manager, Interborough Rapid Transit Company, entertainment; Roswell P. Cooley, eastern manager, Vapor Car Heating Company, reception; William G. Gove, superintendent equipment, Brooklyn-Manhattan Transit Lines, seating; Edward Laterman, general sales representative, Champion Rivet Company, printing; D. M. Brady, president, Brady Brass Company, invitation; Roy V. Wright, secretary, Simmons-Boardman Publishing Company, publicity.

ORGANIZATIONS of railway employees in Colorado, acting as a unit, have protested to the Public Utilities Commission of that state, asking that no more permits be granted motor buses and freight trucks operating on the highways in competition with the established steam railways.

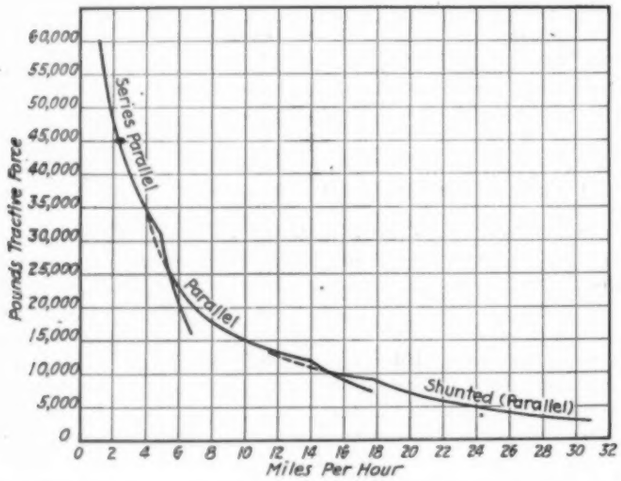


100-Ton Oil-Electric Locomotive Built Jointly by the General Electric Company, Ingersoll-Rand Company, and the American Locomotive Company

Oil Electric Locomotive Makes Record Run

Travels 537 *miles in* 28 *hr.* 45 *min. with a load of* 377 *tons on* 473 *gal. of fuel oil*

ON December 16, 1925, the new 100-ton oil-electric locomotive built jointly by the General Electric Company, the Ingersoll-Rand Company and the American Locomotive Company for the Long Island, completed a run of 537 miles from Erie, Pa., to Greenville, N. J. This trip was made primarily for the purpose of delivering the locomotive under its own power to the lines of the Long Island Railroad. The route was over the Pennsylvania via Williamsport, Pa., Harrisburg, Pa., and Trenton Junction, N. J. The oil-electric locomotive hauled a train of five loaded box cars, one passenger car and a caboose, making a total train weight, including the locomotive, of 377 tons. The total time required to make the trip was 40 hr. 24 min,, of which 28 hr. 45 min, was consumed in actual running. A total of 473 gal. of fuel oil was consumed during the run, making an average fuel consumption of 6.35 lb. of fuel oil per locomotive mile.



Speed-Tractive Force Curve of 100-Ton Oil-Electric Locomotive

The records taken during the trip also showed a low consumption of lubricating oil. A total of five gallons was used, which if estimated at the current price of 50 cents per gallon would make the cost of lubricating oil consumed during the run, $2.50. This amount added to the cost of fuel oil at five cents per gallon, would make the total cost of oil consumed for a total of 202,449 ton-miles, $26.15.

Besides the low consumption of fuel and lubricating oil, a feature of the run was the time consumed in actual running. The locomotive is designed for slow speed switching service, with a maximum speed of 30 m.p.h. During the run an average speed of 18.7 m.p.h. was maintained. Most of the detention time was taken up for the taking of photographs and standing in the clear for superior trains. The steepest grade negotiated was 1.6 per cent for a distance of eight miles leaving Erie. Data giving a summary of the records taken during the run is shown in one of the tables.

General Design of the Locomotive

The design and construction of the 100-ton locomotive is similar in many respects to the 60-ton oil-electric locomotive built by the same companies and described in the May 10, 1924, and August 1, 1925, issues of the *Railway Age*. One of these 60-ton locomotives has been in switching service for several weeks in the Bronx, N. Y., freight terminal yards of the Central Railroad of New Jersey.

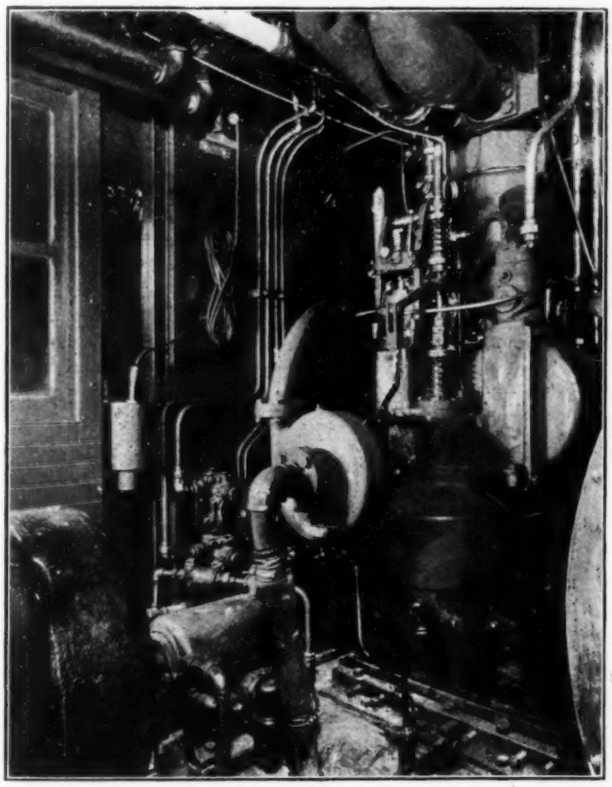
The cab of the 100-ton oil-electric locomotive is of all-steel construction and extends the entire length of the locomotive. Its general appearance is similar in many respects to that of an electric locomotive. The width of the cab is 9 ft. 4 in. and the overall length is 40 ft. The overall height of the locomotive, measured from the top of the rail, is 13 ft. 9½ in. The cab is divided into three compartments. The central compartment contains the power plant, oil and water tanks, control equipment and

heater. The two end compartments are reserved for the control and operating apparatus. Clear vision for the operator is provided by means of end and side windows. A hatch is provided in the roof of the central compartment directly above the oil engines to permit their removal. A smaller hatch is also provided in the main hatch to facilitate inspection.

The major equipment consists of two 300-hp., six-cylinder, four-cycle, Ingersoll-Rand oil engines, operating at 600 r.p.m., which are located along each side of the central compartment and midway between the two trucks; and two General Electric, type TDC-6, 200-kw., 600-volt generators, directly connected to the oil engines. The generators are placed at opposite ends of the central compartment in order to secure an even distribution of the load. They supply current to four General Electric, 600-volt railway motors which are geared directly to the axles.

The Oil Engines

The oil engines are of the vertical, six-cylinder, four-cycle, single acting, variable speed type having direct fuel oil injection, which is effected by means of two opposed spray nozzles in each combustion chamber. Oil is delivered to the nozzles under pressure by an injection

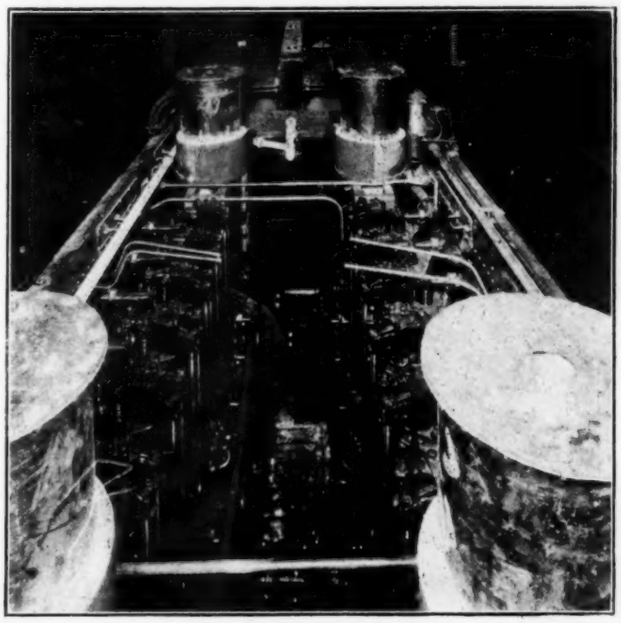


Interior View Showing the Fuel Oil Injection Pump and Circulating Water Pump of One of the Oil Engines

pump driven from the main shaft. Ignition is accomplished by the heat of compression only. One fuel injection pump for each engine serves all six cylinders. Fuel oil distribution is effected by a distributor timed to admit oil successively to the spray nozzles of each cylinder in the proper firing order. The engines are rated for a fuel consumption not to exceed .43 lb. per b.hp. at the rated load and speed based on oil containing 19,000 b.t.u. per lb. and having a flash point not lower than 150 deg. F. The total capacity of the fuel oil tanks is 400 gal.

Each engine is equipped with a self-contained, force feed lubricating system. Lubricating oil is pumped to the various moving parts of the engine by a gear-driven pump located in the crank case. Provision is made to filter the oil which comes in contact with the cylinder walls before it is returned to the oil reservoir.

The cylinders, cylinder heads and combustion chambers are completely water-jacketed. Cooling water is circulated by a centrifugal pump driven from the crank shaft. The temperature of the water in the engine jackets is regulated by a thermostatic valve which controls the cir-



View of the Engine Compartment Taken from the Top of the Locomotive with the Main Hatch Removed

culation of the cooling water from the engines to the radiators on the roof of the cab.

The engines are started by compressed air at approximately 200 lb. pressure, which is admitted to each cylinder in succession through mechanically operated starting valves. Compressed air for starting is provided by a Mianus two-cycle gasoline driven air compressor. Three high pressure air storage tanks are also provided for retaining a supply of compressed air for starting the oil engines.

The Electrical Equipment

The generators are 200-kw., 600-volt, direct current, compound-wound, and are separately excited. The voltage is regulated by the current demands of the traction motors so that the product of this current and the voltage is constant for any given engine speed. This makes it possible for the full power capacity of the oil engines to be applied to the drawbar at any speed of the locomotive, and accounts for the relatively large tractive force rating of this type of locomotive.

A 6-kw., 60-volt exciter is mounted on the same shaft with the main generator. A 32-volt, 100-amp.-hr. Exide-Ironclad storage battery is charged by this exciter in series with one of the field windings. The exciter and storage battery circuit, which is used for lighting and control, is controlled automatically by a switch on the main throttle of the locomotive.

Mounted on each of the four driving axles is a direct current, series motor of the single-geared, box frame, railway type, GE-69-C, manufactured by the General Electric Company. Each motor is supported on its axle

by axle brackets and bearings, and by the motor nose which rests on the truck bolster. The gear ratio is 4.375, there being 70 teeth on the gear and 16 teeth on the pinion, both of which are made of forged steel.

The Control System

The speed and stopping and starting of the locomotive is controlled from either end of the cab. There are two control handles. One is a throttle lever which controls the output of the engines and the other is a master controller, or electric switch handle, which connects the traction motors in series or in parallel for either forward or backward movement. No rheostats are used in the power circuit.

In operation, the electric control handle is set for either forward or backward motion, with the motors in series for speeds below five miles per hour, or in parallel for speeds above five miles per hour. This regulation of the

View of the Engine Compartment Showing the Location of the Two Oil Engines and Generator Sets

speed and tractive force delivered is illustrated by the speed-tractive force curve shown on the chart. The position of the throttle lever determines the power delivered by the engines, which is transmitted by the generators to the motors, automatically adjusting the relation of tractive force and speed to the load on the locomotive and also automatically changing this relation to suit the varying requirements of acceleration or the grade conditions.

Referring to the speed-tractive force curve on the chart, it will be noted that the locomotive develops a tractive force of 60,000 lb. at 30 per cent, the factor of adhesion maintained to approximately one mile per hour. At ten miles per hour the locomotive develops a tractive force of 15,000 lb.

The air brake equipment consists of the Westinghouse, schedule EL-14, straight and automatic air brake. The foundation brake rigging is designed to give a total brake shoe pressure of 60 per cent of the weight on the drivers with a 50-lb. cylinder pressure. The brake cylinder is 18 in. by 12 in. An air compressor for providing air for braking is installed in the cab. It has a piston displacement, when working against 130 lb. pressure and at 600 volts, of 100 cu. ft. per min. It will deliver air at a pressure of 90 lb. or 140 lb. per sq. in.

The running gear consists of two four-wheel, swivel, equalized trucks, each of which is equipped with a cast steel bolster and steel side frames. The side frames are carried on semi-elliptic springs to the equalizers which are in turn carried on the journal boxes. The journal boxes are of cast steel, pedestal type with A.R.A. bearing and

MAIN LINE TEST OF LONG ISLAND 100-TON OIL-ELECTRIC LOCOMOTIVE, No. 401

Start of test—Pennsylvania enginehouse, Erie, Pa.	7.15 a.m., Dec. 15
Conclusion of test—Pennsylvania freight terminal, Greenville, N. J.	11.38 p.m. Dec. 16
Trailing load	5 box cars, 1 passenger coach, 1 caboose
Total train weight, including locomotive	377 tons
Miles traveled	537
Total time elapsed	40 hr. 23 min. 45 sec.
Actual running time	28 hr. 44 min. 45 sec.
Total detention	11 hr. 39 min.
Average speed	18.7 m.p.h.
Maximum speed	30 m.p.h.
Total kw.-hrs. generated	3810
Average oil engine load factor, per cent	23.6
Maximum oil engine load factor, per cent	74.1
Total fuel oil consumed, gallons	473
Total lubricating oil consumed, gallons	5
Total water consumed, gallons	negligible
Total ton-miles	202,449
Total oil cost (fuel oil at 5 cents per gal., and lubricating oil at 50 cents per gal.)	$26.15
Fuel cost per 1,000 ton-miles, cents	12.90
Fuel cost per locomotive mile, cents	4.86
Fuel cost per kw.-hr. generated, cents	.685
Average fuel oil per kw.-hr. generated, pounds	.895
Average fuel oil per locomotive mile, pounds	6.35
Average fuel oil per 1,000 ton-mile, pounds	16.85

wedge. With the exception of the truck equalizers, axles and that part of the traction motors carried on the axle, the entire weight of the locomotive is spring supported and equally distributed over the four pair of drivers. The axles are of forged open-hearth steel and have 6½-in. by 12-in. journals.

The locomotive is equipped with Leach type D-1 air

PRINCIPAL DIMENSIONS AND PROPORTIONS OF LONG ISLAND 100-TON OIL-ELECTRIC LOCOMOTIVE, No. 401

Builders	General Electric Company; Ingersoll-Rand Company; American Locomotive Company
Type	Oil-electric
Service	Switching
Weights on drivers	200,000 lb.
Wheel bases:	
Truck	7 ft. 2 in.
Total locomotive	36 ft. 2 in.
Oil engines:	
Number	2
Type	Ingersoll-Rand, 6 cyl., 4 cycle, vertical
Rated capacity	600 hp.
Cylinders, diameter and stroke	10 in. by 12 in.
Speed	600 r.p.m.
Piston speed	1,200 ft. per min.
Fuel	Fuel oil
Generators:	
Number	2
Type	General Electric, Type TDC-6, 200 kw. d. c., 600 r.p.m., 600 volt
Exciter	6 kw., direct connected, 60 volt
Voltage, variation	200—750 volts
Motors:	
Number	4
Type	General Electric, Type GE-69-C, 200 hp., 600 volts
Capacity of fuel tanks	400 gals.
Length over couplers	45 ft. 10 in.
Diameter of wheels	36 in.
Size of journals	6½ in. by 12 in.
Tractive force	60,000 lb. at 30 per cent factor of adhesion maintained to approx. 1 m.p.h.

operated sanders, arranged to sand in front of the leading truck for either direction of operation.

A Peter-Smith water heater and expansion chamber is provided to keep the cooling water from freezing when the engines are not operating and for circulating hot water through the radiators in the operator's compartments. Provision is also made for circulating hot water through the radiators from the circulating system of the oil engines.

Advantages of the Potter Plan

Proposer of pooling measure issues memorandum asking discussion and criticism

MARK W. POTTER, one of the three receivers of the Chicago, Milwaukee & St. Paul, former Interstate Commerce Commissioner, and the author of the Potter plan, has issued a 100-page pamphlet or memorandum amplifying further his arguments in favor of the plan, answering the objections that have been made to it and containing citations from court decisions and more detailed exhibits than have been previously offered. In addition, he makes a plea for criticism and discussion of his proposals.

The Potter plan calls for an increase of 5 per cent in the rates of the western carriers, the pooling of the proceeds and a distribution among the western railways in proportion to their deficiency under a return of 5¾ per cent upon their property investment. The plan has been outlined in various articles which appeared in the *Railway Age*. The proponents of the plan believe that the plan is legal and in strict accordance with the terms of the Transportation Act as construed by the courts which, they maintain, sets up new views of the social concept whereby it is required that the railways must be regarded as a whole system in which the interests of any one carrier must be subordinated to the interests of the transportation system and the public welfare as a whole.

In his present memorandum, Mr. Potter refers to these several points and supplements them with various arguments, among which some of the more interesting are the following:

"The plan provides insurance against adversity and, in the long run, would inure to the advantage of all carriers, and to the public which must have efficient transportation. It is not designed to equalize prosperity. It does not contemplate pooling of all earnings, but only a small percentage as an insurance against disaster and in the interest of moderate but general justice. It would create a fund that shippers would provide to insure the efficient transportation that they need. It applies to transportation a co-operative protective principle which is being applied increasingly in miscellaneous activities of varied character. Every carrier, however, strong, depends upon other carriers, more than upon anything else, for its prosperity. None could survive alone. Corporations as well as individuals are dependent upon group associations for protection. The need of co-operation and reciprocal support is universal. It is believed to be a plan which might well be adopted voluntarily by all carriers, for their mutual protection at times of occasional adversity.

High Rate Level Would Give Prosperous Carriers Too Much

"Unless in the rate structure there is provision for a fund available for distribution in accordance with carrier need, a rate level high enough to sustain the less prosperous carriers will give others far too much. A level low enough to yield the more prosperous carriers only a fair return will ruin others. In one case the aggregate collection will be more than the law allows and in the other less than the law requires. With a general group level, at the present, so high as to yield certain carriers far too much, many are in distress. It is not possible to make the level high enough for all, without a fund made subject to distribution according to carrier need, because the limit upon aggregate group revenue prohibits it, and such a level would be grossly unfair to shippers. If a small percentage of what shippers pay is pooled and made available for distribution in accordance with carrier need, the injustice to shippers of excessive returns to some carriers would be mitigated; reasonable protection to all against disaster would be provided and efficient transportation would better be assured—all at the lowest possible cost to shippers.

Consolidations

"The idea back of a pooling plan is in large part similar to that for consolidations. An important practical difference is in the likelihood that the pooling plan can be engrafted on the present system of regulation promptly as a part of the procedure of making rates and fixing divisions, to provide transportation and in furtherance of a realization of the fair return to all carriers from fair levies upon shippers, and with certainty of success, free from legal complications.

"Actual consolidations cannot be accomplished promptly or easily, and are dependent upon the solution of all sorts of problems growing out of legal and constitutional questions. Compulsory consolidations involve difficulties that no one yet has solved, and if they can ever be forced directly, it will be only after long delay. Voluntary consolidations will not be made to more than a limited extent. Hundreds of essential carriers will be left out and their owners will suffer losses in vast amounts. Important parts of the transportation machine will show increasing impairment of their efficiency. After carriers do all they will or can be compelled to do, the so-called railway problem will remain unsolved.

"Carriers will be deterred in making consolidations for reasons that cause opposition to the pooling plan. It is being urged that consolidations will compel the strong carriers to support the weak; will stabilize credit and security values and make possible a reduction of rates on agricultural products and other basic essentials. The carriers oppose the pooling plan because they believe it will tend in these directions, and it will. The strong carriers will voluntarily absorb the weak only when they can acquire them for less than their real worth, which is not fairly indicated by earnings possible under present conditions and as controlled by the existing adjustment. The government should not give unworthy aid. It should not apply or permit a system of regulation that will so emaciate lines built in good faith to serve the public interest, that the strong carriers may assault them with impunity.

"The natural desire to buy as cheaply as possible may seem to justify opposition to the pooling plan. Similarly, desire on the part of the lines that are to be absorbed, to have their real worth paid, may prompt their support of the pooling plan. Disinterested outsiders would say that both should apply the test of what is fair in considering the purchase price. Whatever may be the seeming warrant for continuing an injustice, there must always be greater reason for correcting it. It would apparently be fair, first to apply a pooling plan to restore to injured carriers before absorption, the earnings and values to

which they are justly entitled. No great endeavor appears to have been made by the strong carriers generally to acquire the others. It would not appear to work injustice if weak carriers were taken in at their real value rather than at values depreciated by low earnings brought about by governmental reductions of income and increase of costs, and even by disregard and violation of the spirit of the existing law by strong carriers that would absorb the weak.

A Pressure to Expedite Consolidation

"A pooling plan would be likely to apply a pressure that would expedite consolidations. When the strong carriers learn that they must account to the weak for what the shippers pay on their values to maintain them, they will be likely to be more expeditious The attitudes of carriers are encouraging the conclusion that some sort of pooling plan is essential to combine legitimate and effective governmental stimulation with sincere and intelligent carrier endeavor to bring about consolidations.

"In the main, consolidations at fair values will only accomplish that desirable consolidation of earnings that would be brought about by pooling. In fact, the consolidation of earnings cannot be accomplished so satisfactorily through a consolidation of systems and properties as through the utilization of a pooling plan. Consolidation of all lines into trans-continental systems would be necessary to accomplish that. Conceivably, there may some time be certain railway systems that through consolidations will be made to extend from coast to coast. There cannot be many such systems and it will be impossible to put all carriers into them. It would be impossible to bring together the grain carrying lines and many of the Eastern lines that carry high-class commodities in large volume.

"It would appear that all objections that are made to a consolidation of earnings limited to the pooling of a small percentage, could be urged with greater force against a consolidation of companies and properties. Consolidations of properties would pool all earnings of the constituent companies. The strong companies would thereby assume all the burdens of the weak.

"Consolidations will bring about complete pooling. Pooling of a percentage of rates will be a partial consolidation.

"Whether there should be urged actual consolidations of properties and systems, or a partial consolidation through a pooling of a percentage of earnings as more desirable as a first step, appears to be a question to which thought should be given.

"Undoubtedly consolidations of some properties under certain circumstances and conditions are highly desirable. Under other circumstances and conditions and beyond proper limits they are equally undesirable. There is no general rule applicable to all situations. Consolidations might easily be carried to a point where the products would be unwieldy. It is difficult to determine just where to draw the line. An attempt to force, rather than to permit and encourage consolidations is highly dangerous. Government planning is impossible. Consolidation will increase absentee ownership, management and control which is not desirable.

"To determine the availability of consolidations on the one hand or pooling on the other, to meet the railway situation, involves a consideration of what it is thought is desirable to accomplish. There is little chance for disagreement as to the desirable ultimate consummation.

Unification and Co-ordination

"Unification and co-ordination that will permit the use of properties to best advantage and furnish transportation to the public at lowest cost consistent with fair compensation to those who operate and own the properties is the aim. Unnecessary duplication of service does no one any good, is wasteful and should be discontinued. Circuitous routing should be done away with and traffic should take the efficient and economical lines of least resistance. Throwing away money in competitive solicitation should be stopped. The cross-hauling of empty cars should end and much terminal unification should take place. Equipment should be used unfettered by line ownership. Work involved in the building and repair of equipment should be done so as to best serve convenience and economy. Efficiency in many shops should greatly be increased and work should be budgeted and distributed to provide more continuous employment of labor. Inefficient lines should be used only to a minimum extent and overhead should be consolidated and reduced where possible. Relations should be established between the strong and weak lines, so as to combine their credit and resources, insure a fair return and bring about lower rates. Great savings would be enjoyed if the changes mentioned were brought about. The carriers are expected to accomplish them.

"The Transportation Act, 1920, told private owners in the plainest terms that their duty is to reform along the line suggested. The plain intent of the Congress was to give private ownership another chance. It was realized that at least some carriers would not accept the new policy of the Transportation Act, though others would. Large powers were given to the commission to assist deserving carriers and compel the recalcitrant. The commission has waited to give carriers opportunity to initiate reform, but there are signs that the commission is becoming impatient. It evidently is contemplating greater activity with its service bureau, and seemingly there is warrant for its action.

The Angle of Government Ownership

"At the present time, the general thought undoubtedly is opposed to government ownership. It may be that the public mind has not been finally made up. What the final conclusion will be will depend upon what is finally determined to be best. Intelligent opposition to government ownership can be based only on the belief that it is not best. If the public ever believes it to be best the public will have government ownership. At present the desire of the public seems to be that where possible the government shall keep out of business. Anything that can be done as well or approximately as well should be done under private ownership. Therefore, government ownership is not being considered. But certainly private owners must have full regard for the public interest in managing their properties.

"The desirable ultimate in co-ordination and unification of policies and properties through consolidation cannot be achieved merely by consolidations into as few as twenty or thirty systems. Consolidation of all into one system would be necessary.

"The first essential of satisfactory progress would seem to be that executives think of the railroad problem and of their problem as a requirement to furnish transportation to the public at the lowest cost consistent with fair return to those who operate and own the properties. Constant watchfulness is required lest individual rivalries and ambitions lead to sacrifice of the general good. Exclusive thought by executives of their own, in disregard of the interest of other properties, is hostile to the public interest.

"Seemingly the effect of pooling a portion of the earnings of all carriers would be to tie their interests together so as to encourage co-ordination and unification of prop-

erties and policies. It would be consolidation in practical fashion. It should prompt regard for efficiency and economy. It should lessen wasteful rivalry. It should justify earnest effort to think of the general good and make reform possible without loss or injustice at any point. It should afford protection to carriers generally that would justify sound management policies in the public interest. It should warrant pressure by regulating agencies to bring about reform. It would seem to point the way to accomplish in large part the benefits of a national, unified system, while preserving the benefits of private ownership.

"A pooling plan would make the law workable. It would go far to solve the railroad problem. It would bring deserved recognition in large amounts to inherent values that now are being shrunken by injustice though entitled to protection. It would lessen and perhaps end bankruptcy of meritorious carriers. It would improve protection of interest and dividends while holding shippers' payments to a minimum. The pooling plan applied to the proceeds of a rate increase of as little as 5 per cent would be greatly to increase the efficiency and strength of less prosperous carriers."

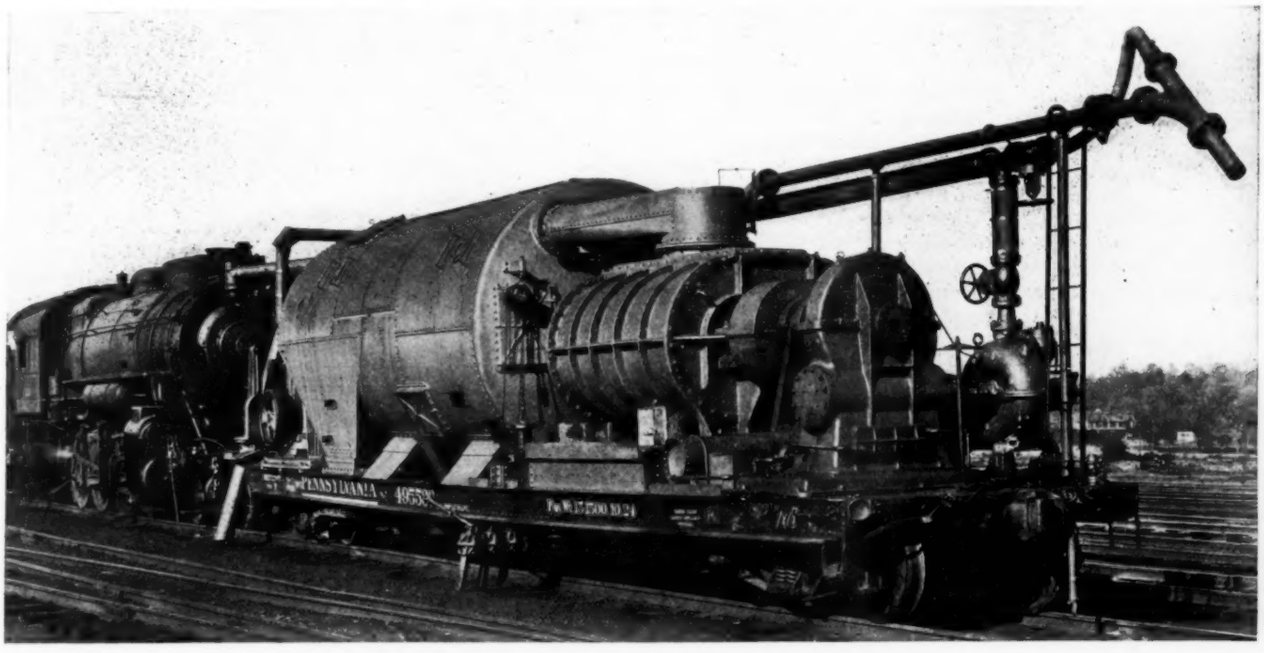
Vacuum Cleaner Renovates Ballast on Pennsylvania

A VACUUM cleaner of such size and power that it is capable of lifting stone ballast and the foreign matter embedded in it from the track to a cleaning chamber mounted on a car has been employed in renovating ballast on the Philadelphia division of the Pennsylvania during the past summer. The ballast is sucked up, cleaned and returned the ballast to the track continuously at the rate of 33-ft. rail length every three minutes and at an average rate of about 0.6 mile per day of 10 hours. This machine is the result of more than five years' study and development.

While the principle on which the cleaner works is simple, the adaptation of the vacuum system to the practical cleaning of stone ballasted track calls for very careful study of the requirements and design of the machinery to obtain the desired capacities and keep the machine within the limits of clearance and weight. A partial vacuum is obtained in a large tank by means of a fan driven by a steam turbine. The tank is divided from top to bottom by a screen set on an angle of about 45 deg., against which the ballast and dirt are thrown. The refuse passing through the screen falls to the bottom of the tank and the velocity of the air is reduced through expansion in the chamber or tank. Baffle plates are arranged over the exhaust orifice to prevent refuse from being drawn through the opening. A flexible armored hose extends into the refuse end of the tank through which the finely screened dirt may be sucked and blown into an ordinary car at the rear of the cleaner. Power for the steam siphon or blower is furnished by a locomotive. The screened ballast falls to the bottom of the tank in the forward quarter where it is caught in small hoppers and passed through revolving valves back to the track within seven feet of the point from which it was taken.

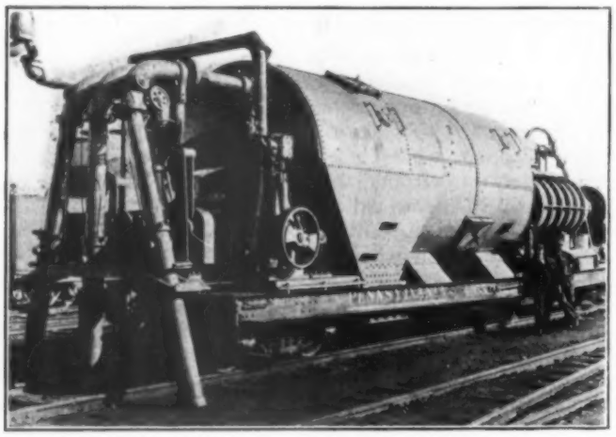
Three intake or suction pipes extend horizontally forward from the end of the tank with telescopic joints and bend from a horizontal to a vertical plane beyond the end of the car in the working position. The vertical section of these pipes is telescopic to permit raising and lowering them by means of wheels and worm gear. One of these pipes works between the rails on which the equipment moves, operating across the track from rail to rail and picking up the loose ballast and dirt as it moves. The other two pipes work outside the running rails on either side and move alternately toward and away from the rail, sucking the ballast and dirt from the inter-track space as far as the mid-point between adjacent tracks.

Steam for the operation of this equipment is furnished by a road locomotive through Barco flexible joints connected to the steam turbine which drives the fan to exhaust air from a large expansion tank. Steam is also used in the small engine on the front end to drive the valve mechanism through which ballast is returned to the track. A two-horsepower electric motor, taking current



A Steam Turbine Is Provided to Drive the Exhaust Fan

from a generator driven by a small engine on the front end, is employed to move the bed-plate on which the suction pipes are mounted. In the non-working position a regular M. C. B. coupler can be used, but when the bed-plate carrying the pipe is run out into the working position a wire cable passing through two snatch blocks on the locomotive pilot is used. The ends of this cable are fastened to a drum driven by a motor which winds up the cable and moves the cleaner to the locomotive. The drum is then released, the locomotive moved back about 15 ft. and the cleaner drawn forward as the ballast is lifted and cleaned. At times it is desirable to clean only the inter-track spaces or the shoulders, under which conditions the center pipe which oscillates between the rails is held in the raised position so that only the two side



The Ballast and Dirt Are Sucked Up Through Three Large Pipes

pipes are operating. When working in this manner the cable is not used, but a special coupler about four feet in length is substituted so that the locomotive can be coupled direct to the cleaner and move it slowly as the cleaning progresses. The car on which the cleaner is mounted is equipped with a plow arrangement consisting of a swinging horizontal arm which can be locked under the car or extended over the inter-track space and from which steel teeth project into the ballast to be plowed or loosened preparatory to cleaning.

This equipment was designed and built by the Sims Pneumatic Conveyor Company, Philadelphia, Pa., and has been in operation all of the past summer. We are indebted to J. B. Baker, engineer maintenance of way of the Eastern Pennsylvania division of the Pennsylvania, with headquarters at Harrisburg, Pa., under whose supervision the machine has been operated, for the above information.

Connecticut Grants New Haven Bus Permits

THE Public Utilities Commission of Connecticut on December 17 granted bus permits to the New England Transportation Company, the bus subsidiary of the New York, New Haven & Hartford, covering 228 miles of route in the state; at the same time it refused applications for permits covering 238 miles. The routes for which permits were granted are as follows:

From New Haven to the Massachusetts state line, via Mt. Carmel, Farmington and Granby, connecting with service to Northampton, Mass.	52	Miles
From Hartford to Waterbury (company asked permit from Hartford to Danbury)	33	"
From New Haven to Danbury via Derby, Oxford, and Newtown	38	"
From Danbury to South Norwalk via Georgetown and Wilton	25	"
From Willimantic to the Massachusetts state line via Pomfret and North Grosvenordale (company asked permit from Hartford to state line; permit denied between Hartford and Willimantic)	35	"
From Plainfield to Rhode Island State line (permit sought from Hartford to state line; permit denied from Hartford to Plainfield)	12	"
From Willimantic to Rhode Island state line via Phoenixville and Putnam (permit sought from Hartford to state line via Willimantic and Putnam; portion from Hartford to Willimantic denied)	33	"

In the case of the Hartford-Waterbury permit, the commission will issue an order later to restrict competition with existing carriers. On the New Haven-Danbury line no local business may be done over that portion of the route now occupied by buses of the Congress Taxi Company.

Permits covering the following routes were denied:

Three applications covering territory between Hartford and Willimantic—refused because of existing bus and trolley service.

Portion of application covering Hartford-Danbury route denied between Waterbury and Danbury because of present service on it by Congress Taxi Company buses.

From Danbury to Bridgeport—also contested by Congress Taxi Company.

From Danbury to Stamford, denied because of existing service of the Danbury-Ridgefield Bus Company.

Some of the permits granted cover routes at least partially served by other carriers—bus or trolley line—and there seems to be some possibility that an appeal may be taken to the courts in one case—that involving the permit covering the route between Hartford and Waterbury.

The applications of the New England Company were hotly contested by independent bus operators, some of whom claimed that the company was not legally entitled to operate as a highway carrier. The commission said in its decision:

"This commission as an administrative tribunal may not be expected to go into detailed analysis of the technical legal claims if there is prima facie evidence of the due formation, existence and capacity of the applicant as a corporate entity. The certification of the Commonwealth of Massachusetts to the legal organization of the New England Transportation Company may be regarded as prima facie evidence 'not merely that the corporation is a legal entity, but that there is no legal bar to the transaction of business as such'."

In its findings on the convenience and necessity for the routes, the commission said that in granting certificates it has always adhered to the policy of protecting vested interests in legally authorized transportation agencies, provided such agencies were willing and able to supply the necessary service.

"The existence of a transportation agency rendering local service over a portion of a proposed through route should not, however, jeopardize the rights of the public at terminal points and along unserved portions of the route, and should not overweigh the reasonable public demand for the installation of the more extended service, even though such service traverse the local section being adequately served. The fact that the applicant in these cases proposes to establish the same rates of fare per mile as the steam railroad rates, with an interchange of tickets between motor bus and rail operations, handle baggage and connect with steam trains at railroad stations, bears principally upon the question of the applicant's superior right to receive a certificate in the event public convenience and necessity exist for the bus service."

An article describing the New Haven's bus operations appeared in the *Railway Age* of December 5. The road has a total of 40 buses in operation at the present time and orders have recently been placed for 51 additional.

Cummins' New Consolidation Bill

Commission required to prepare plan and distribute excess income if consolidations not completed in three years

WASHINGTON, D. C.

VOLUNTARY consolidations, mergers or unifications of railroads, subject to the approval of the Interstate Commerce Commission and with power in the commission to impose conditions, but without the restrictions of a plan, would be authorized by the new consolidation bill introduced in the Senate by Senator A. B. Cummins of Iowa. If at the end of three years, however, the limited number of systems contemplated have not in the opinion of the commission been completely provided for, it would be directed to adopt a plan for the completion of the systems, and consolidations thereafter to be approved must be in harmony with the plan. After the first January after the adoption of the plan roads other than systems certified by the commission as complete would be subject to the recapture of all excess income above 6 per cent on their value, and the excess income of the roads included in a proposed system provided for in the plan would be distributed among the carriers included in that system earning less than 5 per cent.

Until the first January after the adoption of the plan the roads would be allowed to retain half of any excess income, as at present, but the recapture fund would be distributed among the roads earning less than five per cent.

The new bill differs in many respects from that introduced by Senator Cummins at the last session of Congress as a substitute for the provisions of the present law. The most important change is in the use of the recapture as a penalty upon roads that do not conform to the consolidation policy. Hearings on the bill will probably be started soon after the first of the year.

The policy of the bill is stated in a proposed amendment of paragraph 4 of section 5 of the present law to read as follows:

"(4) Inasmuch as the public interest requires that the transportation of passengers and property by railroad shall be at the lowest rates consistent with a fair return upon the value of the railway properties held for or used in the service of such transportation, and inasmuch as the varied conditions under which transportation occurs render it impossible to accomplish that end without the further consolidation of carriers and unification of railway properties, it is hereby declared to be the policy of Congress that a limited number of systems should be established, by the consolidation of carriers or the unification of railway properties within the continental United States, that will, as fully as possible, preserve competition and, wherever practicable, maintain the existing routes of trade and channels of commerce. Such systems shall also be so arranged, so far as practicable, that the cost of transportation as between competitive systems and as related to the values of the railway properties through which the service is rendered shall be the same to the end that such systems can employ uniform rates in the movement of competitive traffic and under efficient management earn substantially the same rate of return upon the value of their respective railway properties."

Proposed paragraph 5 provides that in order to bring about such consolidation or unification, it shall be lawful for two or more carriers to propose, and present their application to the commission for the approval of a corporate consolidation or merger; the unification of railway properties by acquisition of railway properties or franchise rights, or the right to operate railway properties; and/or the unification of control by the acquisition of securities, if such acquisition is in pursuance of an arrangement or purpose to acquire control or additional control.

Commission to Prescribe Conditions

If after hearing the commission finds that the provisions of the law have been complied with, that the public interest will be promoted, and that the proposed consolidation or unification is in harmony with and in furtherance of the policy declared, the commission would be directed in paragraph 9 to enter an order approving and authorizing the consolidation or unification, on the terms and conditions and by the methods set forth in the application, or with such modifications thereof, or upon such terms, conditions, and methods, as it may prescribe.

At any time prior to the entry of any such order, any carrier may file with the commission an intervenor's petition praying that it be made a party to the proposed consolidation or unification, setting out the terms which will be acceptable to it in the event that it is made a party thereto, and such other matters as the commission may require. If the order of the commission requires that a carrier not joining in the application be made a party to the proposed consolidation or unification, the carriers presenting the application may report back to the commission the efforts made by them to comply with the requirement; and if, after hearing, the commission is of opinion that the carrier that is to be made a party, is insisting on unreasonable terms, the commission may amend its order by revoking or modifying the requirement or prescribing the terms on which the carrier may be made a party to the proposed consolidation or unification.

On and after the effective date of the order of the commission approving a consolidation or unification, each carrier designated therein would have authority and power to carry into effect, and to do any and all acts necessary, or appropriate for carrying into effect, the consolidation or unification, in accordance with such order; and such carrier would be relieved from any restraints or prohibitions of federal laws such as the anti-trust law or of the laws or constitution of any state or any decision or order of any state authority, in so far as may be necessary to enable such carrier to enter into and carry into effect such consolidation or unification.

The commission would be authorized, from time to time after the effective date of its order approving and authorizing the consolidation or unification, to require railway properties to be made available for common use and at any time to require a carrier to extend or enlarge its properties, as provided in the application or order. For the purpose of this paragraph a carrier would be permitted, if authorized by the commission, to exercise the power of eminent domain and acquire the securities held by non-assenting holders if necessary by condemnation.

The bill provides that no tax shall be levied under any revenue law of the United States, or any state or any political subdivision thereof, in respect of any issuance, sale, delivery, or transfer of any security or any agreement to sell, or memorandum of sale of, any security, or any grant, assignment, transfer, or other conveyance of any interest in real or personal property, if in pursuance of a consolidation or unification authorized and approved by the commission.

Plan After Three Years

If at the end of three years from the passage of the Railway Consolidation Act of 1926, the limited number

of systems to be established in accordance with the policy set forth in paragraph (4), have not, in the opinion of the commission, been completely provided for in the orders of the commission issued under paragraph (9), the commission would be directed, as soon as practicable, to prepare and adopt a plan for the completion of such limited number of systems, either by the establishment of additional systems or by the allocation to any existing system of any carrier or any railway properties not included in any such approved consolidation or unification. Such plan shall not, however, under the terms of the bill, provide for the separation of any carriers or railway properties included in any consolidation or unification approved by the commission under paragraph (9), unless, prior to the adoption of the plan, the board of directors and the holders of the voting securities of each of the carriers designated in any such order grant consent thereto. The commission may at any time after the adoption of the plan, either upon its own motion or upon application, prepare and by order, entered after such notice and public hearing, adopt modifications of such plan.

The plan would provide for the completion of the limited number of systems by consolidations or unifications in accordance with principles to be stated therein, "including the preservation of competition as fully as possible, the maintenance of existing routes of trade and channels of commerce wherever practicable, and the allocation of such carriers and railway properties into systems so that, so far as practicable, the cost of transportation as between competitive systems and as related to the value of the railway properties through which the service is rendered shall be the same, to the end that the systems can employ uniform rates in the movement of competitive traffic and under efficient management earn substantially the same rate of return upon the value of their respective railway properties."

Provision is also made for the exclusion from such systems of property (terminal or line) the operation of which as a separate property may be deemed by the commission to be in the public interest, and of any lines affiliated with the lines of Canadian companies.

After three years from the passage of the Railway Consolidation Act of 1926, no consolidation or unification could be authorized or approved under paragraph (9) unless it is, in addition, in harmony with, and in furtherance of, the plan.

At any time after the adoption of the plan by the commission, the bill provides, any carrier which in the opinion of the commission owns or controls the major part of the main-track mileage within any system may present to the commission an application for authority to acquire, through condemnation proceedings, the ownership or control of any of the remainder of such main-track mileage or other railway properties within the system. After hearing, the commission may enter an order approving and directing such acquisition, with such modifications of the application as it may prescribe. Thereupon, the acquisition may be effected in accordance with such order, the laws or constitution of any state or the decision or order of any state authority to the contrary notwithstanding.

Paragraph (2) of section 5 of the present Interstate Commerce Act, is proposed to be amended to read as follows:

"(2) Whenever the commission is of the opinion, after hearing, upon application of one or more carriers engaged in the transportation of passengers or property subject to this Act, that the acquisition, to the extent indicated by the commission, by one or more of such carriers of the control or additional control of any other such carrier or carriers, either under a lease or by the purchase of stock or in any other manner, not involving the consolidation of such carriers, and not in conflict with the policy declared in paragraph (4), as amended, will be in the public interest, the commission may by order approve and authorize such acquisition, under such rules and regulations, for such consideration, and on such terms and conditions as it finds to be just and reasonable in the premises. Any such application shall be dismissed if the commission is of opinion that the application is one that is authorized to be presented under paragraph (4), as amended."

Recapture Provisions

The proposed amendments to the recapture provisions of Section 15a of the law provide that net railway operating income in excess of 6 per cent, computed by systems, shall be recoverable by and paid to the commission for the purpose of establishing a general railroad contingent fund, except that, until the first day of January following the adoption of the plan by the commission, one-half of such excess shall be placed in reserve funds as at present and that the recapture provisions shall cease to be in effect in respect of any system or carrier within a system certified by the commission to be complete.

The provisions of paragraphs (6), (7), and (8) of section 15a of the Interstate Commerce Act would remain in force in respect of any excess income prior to the January 1 following the passage of the bill.

Paragraphs (10) to (15), inclusive, of section 15a of the Interstate Commerce Act are proposed to be amended to provide that the commission shall, as soon as practicable after the close of the calendar year 1925 and each year thereafter, determine the carriers that have received during such year a net railway operating income less than 5 per cent of the value of the railway property held for and used in the service of transportation, and the amount by which any such carrier has failed to earn 5 per cent, and that all moneys paid into the general railroad contingent fund attributable to excess income for any period terminating before January 1, 1925, and all accretions thereof, shall be distributed by the commission among the carriers "in furtherance of the public interest in railway transportation," in amounts proportionate (as nearly as may be) to the amounts by which each carrier failed during 1925 to earn 5 per cent.

All moneys paid into the fund attributable to excess income for 1926 and each subsequent calendar year terminating on or before December 31 of the year in which the commission adopts the plan would be distributed in amounts proportionate to the amounts by which each carrier failed during the same calendar year to earn 5 per cent

All moneys paid into the fund attributable to the excess income for any subsequent calendar year, and all accretions thereof, derived in respect of the railway properties included within any system provided for in the plan (whether or not the establishment of such system has been completed) would be distributed among the carriers operating such railway properties in amounts proportionate (as nearly as may be) to the amounts by which each such carrier failed during the same year to earn 5 per cent.

However, it is provided that no distribution for any year shall be made under the preceding paragraph which, together with the net railway operating income of the carrier for the same year amounts to more than 5 per cent of its value.

The commission, whenever it finds that any system is complete, would certify such fact and specify the date of such completion and the recapture provisions would cease to be in effect in respect of any system or any carrier within such system on and after such date.

Any action taken prior to the passage of this bill under paragraphs (2), (4), (5), and (6) of section 5 of the Interstate Commerce Act, as amended, by the commission or in pursuance of an order of the commission made prior to such passage, would have the same effect as though the bill had not been passed.

Maintaining An Electrical Contact System

Swiss Federal Railroads have well developed organization for the maintenance of overhead catenary on electrified lines

By H. W. Schuler
Electrical Engineer, Swiss Federal Railroads

THE electrification of a steam railroad calls for the creation of a new staff of employees, which cannot be recruited from those already employed for maintenance work on the steam operated railroad. The maintenance of the contact line must be done by linemen

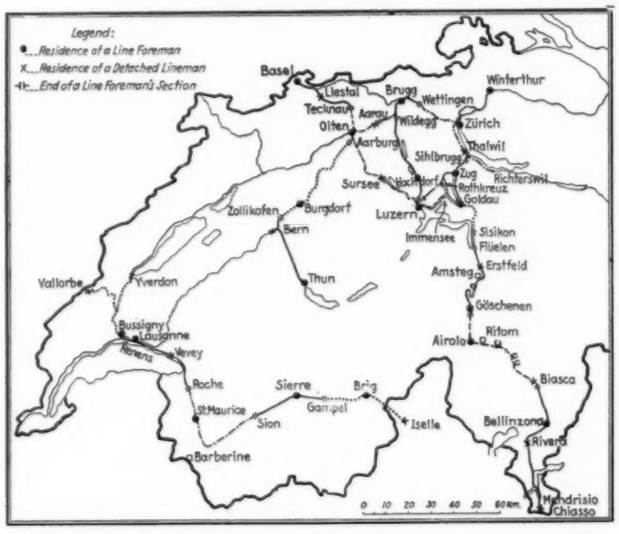


Fig. 1—Map Showing the Line Foremen's Sections of Those Lines Which Will Be Electrically Operated By the End of 1925

expert in the construction of catenary lines and, as in the case of the Swiss Federal Railroads with its 15,000-volt contact lines, they must be men accustomed to high tension work. They must be ready at any time to repair damage on the contact line in as short a time as possible

As a rule, the whole section between two substations feeding simultaneously into it is influenced by a disturbance occuring on the lines, as in most cases this disturbance is a short circuit. Then traffic is suspended until the short circuit is located and that part of the lines cut out which contains the fault. It is not the purpose of this article to go into the details of the sectionalizing systems which help to eliminate faults quickly, but it may be stated that in most cases it is possible to cut out a defective part of the contact lines in so short a time that traffic is not delayed. It may happen, however, that even though a section is fed from both ends, through traffic cannot be maintained. Then quick repair work is the first and most important thing to be done.

In order that it may take but a short time to get skilled repairmen to the place where a disturbance has occurred, linemen in charge of the maintenance of the contact lines are distributed along the electrified lines. They are stationed at places where the probability of disturbances occurring is greatest and where they are able to reach places further away in a short time. Fig. 1 shows the distribution along all of the Swiss Federal lines which will be electrically operated at the end of 1925. The organization within the three divisions of the railroad system and between divisions and general administration is shown in Fig. 2.

A line maintenance crew consists of from four to eight linemen and a foreman according to the importance of the section which they have to maintain. Sections which comprise stations and lines with steam and electric traction mixed require a larger crew than with electric traction only and with climatically favorable conditions. In large stations and terminals, where there is still intensive steam operation, insulator cleaning can only be done by the aid of men employed especially for that purpose. The reason for this is that the intervals between trains are so

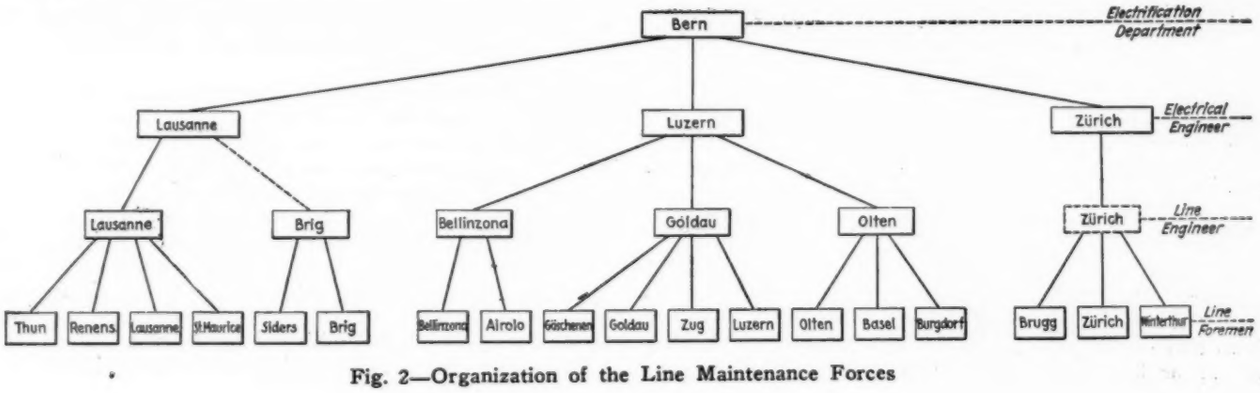


Fig. 2—Organization of the Line Maintenance Forces

short that certain parts of the overhead lines can be disconnected only for a few hours a day. As a rule, line foremen are attached to such stations from which different routes branch off. In most cases these are stations with an important switching service, so that there are always steam locomotives at hand for any emergency. In case of more important disturbances, when a special repair car has to be used, such steam locomotives are of great value.

If the section of a line foreman is quite long, or if it comprises a large station which is not the residence place of this foreman, some of his men will be detached. In case of a disturbance in the neighborhood of their station or residence they will be able to start repair work long before the foreman reaches the place of trouble. For normal repair work these men are called in with the rest of the gang. The detaching of linemen is especially important on routes with heavy traffic and single track only.

As a matter of course a section belongs to a line foreman only as far as normal repairs and regular maintenance work are concerned. As soon as a disturbance, occurs which as a rule shows up as a short circuit, it is the duty of every foreman and of all linemen who happen to be in the neighborhood to do whatever they can for quickly locating and eliminating the disturbance wherever the boundary of a section may lie.

Line foremen through whose sections transmission lines pass, have to control and maintain these lines also. Where such lines do not follow the railroad and cannot be watched from it individuals are engaged to patrol certain parts of the transmission line and to report immediately in case irregularities, such as broken insulators, abnormal sag and so forth, are observed.

A certain number of line foremen are put under the

Fig. 3—Inspection Motor Car

supervision of a line engineer who has his residence in a railroad center. His principal function is to see that his line foremen do their work systematically, that control work is done in due time, that—and this is most important—in case of extensive disturbances repair work is well organized. Beside that he has to manage all of the administrative work that is a part of any large enterprise.

The line engineers report to the division electrical engineer. The functions of this engineer consist of supervising the maintenance of the transmission and contact lines and of the substations, of consulting and planning as far as line construction work is concerned, of purchasing the materials necessary for maintenance work and of working up of the disturbance reports.

The division electrical engineers report to the contact line office, which is a section of the electrification department attached to the general administration office. This office collects and compiles the data concerning the different parts of the overhead constructions and makes them known to the other divisions. Here also standard forms of catenary construction are worked out and the progress of all work is watched to see that it conforms with the requirements of federal law. Experiences on one division

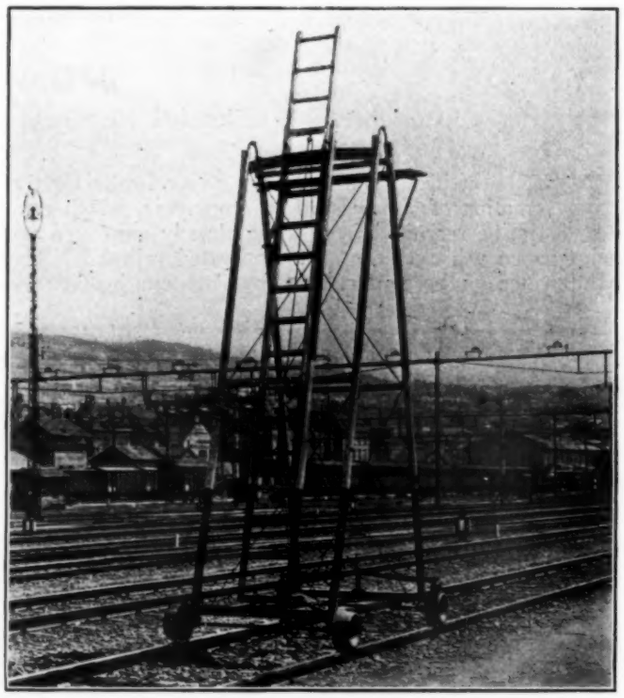


Fig. 4—Rolling Ladder for Repair Work

are made known to the electrical engineers of other divisions by letter, if matters of minor importance are concerned. If the experiences are of a considerable importance and special clarification is wanted, they are discussed in a conference, at which all those participate who are experts in such matters.

The line maintenance service is attached to the service of the chief engineer of way. This is not usual as in most instances it is attached to the service of traction, but it is not important, as a combination with anyone of these services is of no particular value. The purpose of such an arrangement is to reduce the number of men employed but it does not accomplish this purpose. What might be possible is the putting together of similar functions, such as line foreman and substation foreman, of substation operators and linemen, and such combinations are now being tried.

The section of a line foreman comprises an average of 31 miles of electrified route, including 77 miles of track equipped with overhead lines. The section that belongs to a line engineer comprises an average of 98 miles of electrified route including 232 miles of track equipped with overhead lines. As an average, per lineman, there are 5.2 miles of electrified route including 12.7 miles of track equipped with overhead lines. As an average, per employee who is occupied with contact line maintenance, there are 4.2 miles of electrified route including 10.2 miles of track equipped with overhead lines.

Extensive disturbances which need many hours for

repair where the time needed to get to the place of disturbance is of no great importance, are unusual. The usual disturbance is one that can be repaired by using ladders. This means that it is most important to be able to bring the maintenance crew as quickly as possible to the place where repair work has to be done. For this reason every line foreman has an inspection motor car. Fig. 3 shows such a car which will carry four persons and a ladder on a 1 per cent grade at a speed of about 25 miles

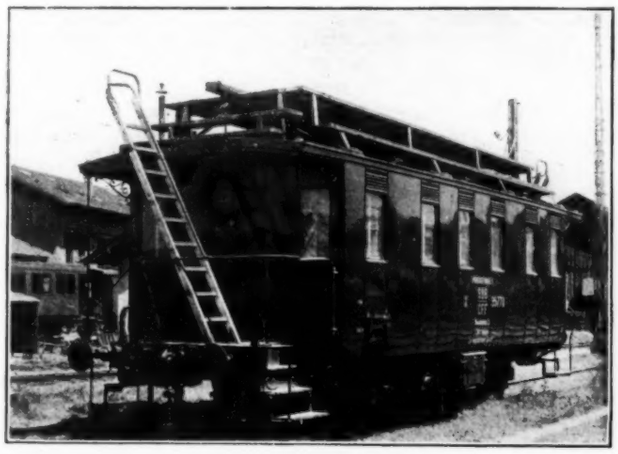


Fig. 5—Repair Car

an hour. The rating of the motor is from 6 to 8 h.p., the weight of the car about 770 pounds, and the price about $840. Emergency material and tools, such as insulators, hangers, clamps, stranded wires, come-alongs, pulleys, keys, wrenches, pliers, portable telephones and grounding sticks can be loaded on the floor of the car. A rolling ladder, shown in Fig. 4, has been found particularly useful. It consists of a little car with a trestle on it, on which a sliding ladder is mounted. From four to six such rolling

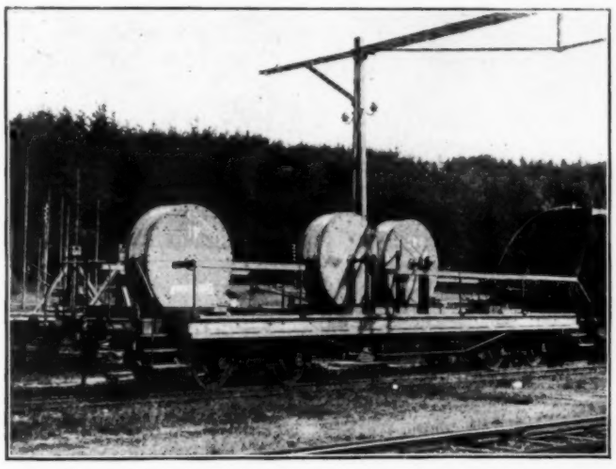


Fig. 6—Emergency Car

ladders are distributed over the section of a line foreman. They are painted red and white like a carrier or a signal pole so as to be easily visible at a distance.

Special repair cars, such as shown in Fig. 5, are used for more extensive repair work and for finishing up emergency repairs. There is one of these on each line foreman's section. A platform is mounted on the roof which can be turned at 90 degrees to form a side platform. The interior of the car is divided into two parts, one a workroom with a work bench, a vise and a set of tools; the other part a storeroom with all material necessary for more extensive repairs. Both rooms are equipped with electric light and the workroom is equipped with a stove for heating. The car is so built that it can run in express trains. As a rule old passenger coaches are used for such repair cars.

Heavy parts such as poles, oil circuit breakers and so forth, are transported on push cars equipped with brakes and used as trailers. These cars may be loaded up to about 1,700 pounds.

Line foremen who have transmission lines to patrol and maintain which do not follow the route but which can be reached by street have a motorcycle or a small automobile. Cars like the one shown in Fig. 6 are used for heavy repair work and fortunately are very seldom required. These cars are equipped with material that cannot be loaded on the repair cars, such as messenger strand and

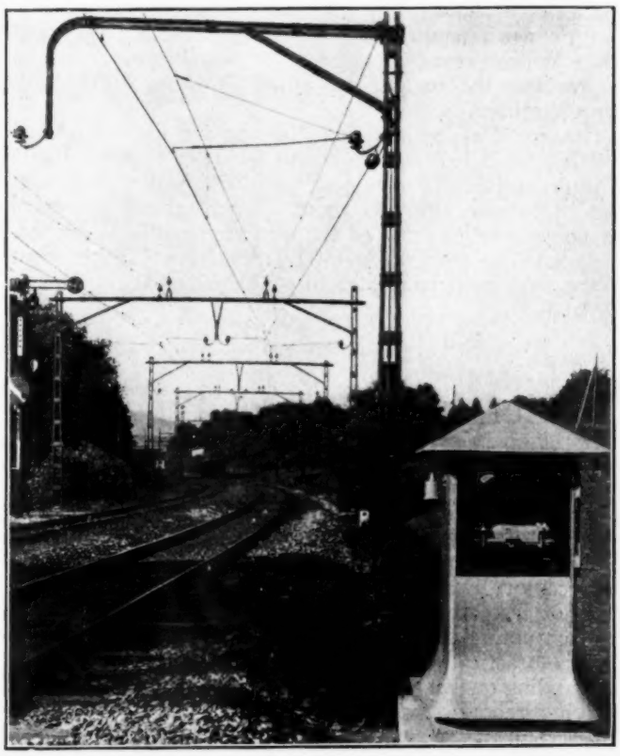


Fig. 7—An Example of the Type of Overhead Construction Used Showing Cable Hut at the Right

contact wire in lengths sufficient for repairing up to 1,500 feet of damaged contact line, wooden poles and timber to support damaged line structures or to temporarily replace destroyed poles and overhead bridges. These cars are located at railroad centers where many distant points can be reached in relatively short time. Such centers always have steam locomotives at hand for hauling the cars to the place where they are needed.

Beside these cars each division has a so-called observation or inspection car with a special-built middle part not unlike the cupola of a caboose to enable unhindered observation of the contact line and of the working of the pantagraphs.

When this car is used it is put in a regular train next to the locomotive. A speedometer indicates the train speed. Roof mounted lights permit observation of the contact line in tunnels. A wire mesh in front of the observation windows protects the observers. The regular inspection of the line by means of this car is important. Even a small

shifting of the contact wire may cause a derailment of the pantagraph shoe which is only 3 feet wide because of the small tunnel clearance. Grounding stick and portable telephone are important tools of the lineman. With the grounding stick he protects himself against induced voltages, but mainly against wrong switching. Naturally the ground stick leads have to be of sufficient size to stand the heaviest currents to be expected without being damaged in anyway.

The portable telephone is important for communication between working place and station or powerhouse where switches have to be operated which cut out the section of contact line to be worked on. The portable telephone can be connected to the telephone line at the cable huts, Fig. 7. These are about half a mile apart and contain the cable splice boxes. Line foreman and linemen wear the same uniforms as all the other railroadmen with the exception of a short rain-proof coat instead of an overcoat as their work requires a measure of acrobatic skill and has to be done regardless of weather conditions. A special hat replaces the regular cap which is of no use in bad, rainy weather.

The costs of maintaining the contact line amounted to $170,000 in 1924, which means $450 per electrified mile of route and $185 per mile of track equipped with contact line. Of these amounts about 75 per cent is expended for wages, clothes, etc., of the men engaged in line maintenance. The sum of $170,000 represents 1.28 per cent of the total capital invested in contact lines at the end of 1924.

Federal Valuation Progress

AN outline of the Interstate Commerce Commission's valuation work was given by T. P. Artaud, executive assistant in the Bureau of Valuation, in an address before the Engineers' Club of Hampton Roads, Va., on December 18, in which he summed up the progress to December 1, as follows:

As of December 1, 1923, field work in the engineering and accounting sections is complete; that of the land section is practically so, although formal field reports are outstanding on five corporations embracing 163 miles. Underlying reports, that is, those of the engineering, land and accounting sections, have been completed as follows:

Engineering Section, 1,756 corporations, 243,820 miles
Land Section, 1,764 corporations, 244,045 miles
Accounting Section, 1,750 corporations, 244,247 miles

Tentative valuation reports, i.e., the combined reports of the three sections prepared after all interested parties have been given opportunity to criticize and object to the statements in the underlying reports, have been served on 999 properties, covering 125,595 miles of road. Reports of the commission which have passed through the stages necessary for "due process of law" have become final on 341 corporations covering 13,774 miles which still leaves considerable to be taken care of.

To the beginning of the current fiscal year, the expenditures by the Bureau of Valuation total $26,893,108.18; expenditures on the part of carriers as reported through their central organization are $83,380,350; and the bureau's appropriation for the current fiscal year is in the sum of $1,946,552.

"A definite program has been adopted by the Bureau of the Budget and Congress for the completion of all final valuation reports as of the primary dates of valuation in a three-year period beginning July 1, 1925," Mr. Artaud said, "and the current appropriation is on the basis of estimates made with that end in view. The estimated appropriation for the two later years shows diminishing personnel and expenditures.

"Except for the general question of 'What practical purpose, adequate to justify the expense incurred, will this inventory and appraisal of railway properties serve?' the question most generally asked of those of us who have to do with the valuation work, is this: 'Admitting its utility, with its findings current and to date, how can data, the compilation of which was begun 11 years ago, be utilized as of the present, particularly in view of the radical changes in price levels, both for labor and the materials?

The answer is that an inventory and appraisal as of a definite date and on a definite price level will have been completed. This constitutes a base figure which can quickly and accurately be equated to present conditions. Valuation Order No. 3 provides for a return by the carriers, which when properly checked and policed as to form and substance by the commission's forces, is a record of all changes in property. The algebraic sum of such property changes and the original valuation will, of course, yield a current inventory, as of any desired date, showing all units of property in service. Actual costs are obtained from Order 3 in the same way. Engineering prices for labor and material can then readily be brought to any given date by the use of indices representing costs as of the date of valuation as compared with the date as of which the determination is desired. This may be done in any desired degree of particularity or refinement and serves to keep the engineering report current both as to the units of property and estimated cost of reproduction. Depreciation may be applied also in any desired degree of refinement from authentic data as to the service life of the several elements.

"The problem in the case of the land section is somewhat more complex and requires a certain amount of additional field work. Trends of prices are not applicable as in the case of engineering items. Methods by which the amount of field work may be limited, such as restricting the territory investigated to that representing significant changes of values and in means of co-operation and through returns to orders analogous to Order No. 3, are in prospect.

"So far, no very extensive work has been done on bringing valuations to date. The commission's object has been to push the completion of the primary valuations and later, as may be found necessary, make them current. Exceptions to this policy have been the cases of roads subject under paragraph 15a to the recapture provisions, that is, those having incomes in excess of 6 per cent of their probable current values. Enough work on such carriers has been performed to fully demonstrate, if any demonstration were needed, the applicability of the methods above outlined.

"It is perhaps inevitable that an undertaking of this magnitude and minuteness should have been subjected to a certain amount of criticism of an adverse or destructive nature in print and by word of mouth. Much of that criticism has been, I believe, based on lack of thorough understanding of the problems presented and failure to appreciate the difficulties attendant upon the commission's work. A cursory examination cannot, because of the complexity of the subject, qualify anyone to pass judgment upon it.

"I venture the assertion that never has any governmental finding met with more careful examination of fact or theory from as many different interests and never has any conclusion required the marshalling of a more formidable array of underlying data. The task has been and is monumental."

Sprague Hearing Resumed

WASHINGTON, D. C.

THE hearing before Division 1 of the Interstate Commerce Commission on the complaint filed by the Sprague Safety Control & Signal Corporation against the New York Central and the General Railway Signal Company was resumed on December 18 and 19, most of the time being devoted to testimony by Frank J. Sprague in criticism of the G. R. S. auto-manual inductive train stop being installed on the New York Central Lines, and of what he termed unfair treatment of his company by the railroad in awarding the contract to the signal company. Ellwood Colahan, of counsel for the Sprague company, offered an amendment of the complaint to allege violation of section 3 of the commerce act. C. C. Paulding, assistant vice-president of the New York Central, objected on the ground that section 3 applies to discriminations in matters of rates and service as between shippers and carriers, not to purchases by a railroad, but Mr. Colahan insisted that the prohibition of unequal treatment is general and it was decided that separate briefs should be filed on this question.

After some testimony regarding the price of various types of train control apparatus Mr. Sprague said the New York Central had agreed to pay the signal company about $500 more per locomotive equipment than he would have been glad to accept for equivalent apparatus. He said that on his return on August 6 from a trip which had included an inspection of installations of his device on four western roads he had called on W. C. Bower, manager of purchases and stores of the New York Central with the idea of proposing a test of a simpler apparatus than that which his company had been testing on the New York Central but had been told that he was too late as the contract with the General Railway Signal Company had been made on July 10. A copy of the contract dated August 5 had been placed in evidence. He said he had expressed surprise that he had been given no intimation that the New York Central would tolerate the simpler form of system, without speed control, and that he was entitled to an opportunity to bid because he could furnish the simpler form at a price several hundred dollars less per locomotive than the price previously quoted. Mr. Sprague said Mr. Bower had given as reasons for adopting the G. R. S. device its lower cost and the fact that its plant was located on the line, as well as the understanding of the railroad's engineers that Mr. Sprague could not furnish the type of apparatus desired, but he said that he was prepared to put in in a week's time a simple automatic stop with forestaller such as his company had installed elsewhere. He had telegraphed his representatives on four western roads as to when any New York Central engineer had inspected their installation and had been informed that none had made any recent inspection except that H. S. Balliet, signal engineer of the New York Central electric division, had inspected the Chicago, Indianapolis & Louisville installation from the rear end of a fast passenger train.

Three of the roads that were using the Sprague system, he said, had reduced their requirements to a simple automatic stop with forestaller and he was prepared to furnish the same thing to the New York Central but had been unable to get its officials to examine it at his shops.

He expressed the opinion that the G. R. S. device is not safe under the conditions of dense traffic on the New York Central and he went over the specifications of the commission in detail to point out respects in which he said it is contrary to the spirit if not the letter of the commission's order.

Mr. Sprague gave a demonstration of the operation of a forestaller which he said was practically like that of the G. R. S. device, showing that, while if the engineman does not perform the necessary movement of the lever within 15 seconds while passing an inductor he will get an automatic brake application, if he finds the 15 seconds will have passed before reaching the stop point he can pull the lever back and start over again, "keeping that up all day if he wants to." Commissioner McManamy asked if that would not demonstrate that the engineman was effectively alert."

Under cross-examination by Mr. Paulding as to his statements that the requirements and changes in requirements made by the railroad during tests of the Sprague device were unfair, Mr. Sprague admitted that the cost was being borne by the road and that it had the right to decide what it wanted but he said that they had burdened his device with increased costs and that comparisons of cost to his disadvantage had been made. Pressed as to who had made such comparisons he said he had been told that they had been made through W. H. Elliott, signal engineer of the New York Central, the Vice-President Williamson of the Northern Pacific.

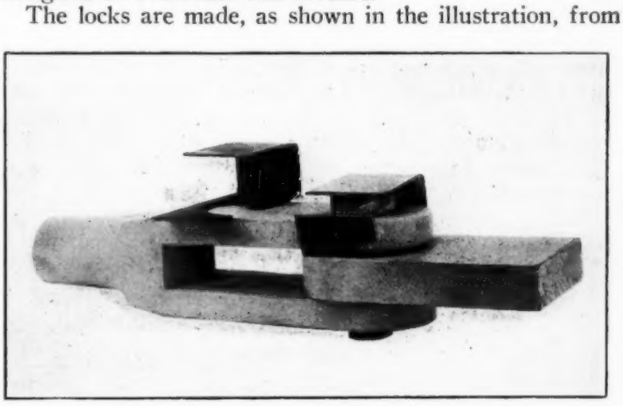
Mr. Sprague said he had sought to impress upon the New York Central the necessity of allowing him a freer hand in the conduct of tests of his device, particularly under various conditions of freight train operation, and that he had been refused, although later some of his requests had been allowed.

When Mr. Paulding asked if he had not "wanted to run the railroad" Mr. Sprague said he had only wanted to conduct the tests in his own way and that while the railroad had the right to ask for what it wanted it should have asked of him the same as was asked of others.

Positive Brake Pin Lock

BRAKE rigging often falls to the track on account of cotter keys wearing or rusting out or not being properly spread in the brake pins, thus allowing the keys to work out. The Illinois Corrugated Metal Company, Springfield, Ill., has placed on the market a device known as a positive brake pin lock which is designed to overcome this trouble.

The locks are made, as shown in the illustration, from



Application of the Type X L Positive Brake Pin Lock

No. 14-gage open hearth steel, cut into strips 4 in. wide and 7⅛ in. long. There are two vee notches in the bend formed by that part of the device which holds the brake pin head in place. The purpose of these vees is to relieve the bend of stress.

After the lock has been inserted around the brake pin between the jaw and lever, it is firmly locked in position by bending the outer lip upward against the side of the

jaw. When it is necessary to remove the pin for adjustments to the brake rigging, the lip of the lock is bent down, thus permitting its removal and allowing the pin to be withdrawn. The device can be applied, taken off and reapplied many times before the lip will break off.

As already pointed out, the device can be applied without removing the brake pin. This has its advantage for when cars are built new or repairs are made, it is often undesirable to apply a lock that requires the removal of the pin, as it takes time to aline the parts.

Changing Problems of Railways and I. C. C.

Consolidation—Motor buses and trucks—Long and short haul clause—Rates—Valuation

By F. J. Lisman
F. J. Lisman & Co., New York

PRACTICALLY no headway has been made in consolidation during 1925, probably because the commission doubted its powers under the 1920 Act to grant authority for leases which are in effect consolidations. This point of view has been clearly and repeatedly expressed in Commissioner Eastman's minority opinions in all permissions for leases or acquisitions of control heretofore granted.

President Coolidge, who was strong for consolidation in his previous public utterances, in his recent message merely referred to the proposed amendment to the Transportation Act, which is intended to give authority to the commission to permit partial, or piecemeal consolidation; or to prohibit any proposed lease, acquisition or consolidation deemed by it contrary to public interest.

The short lines, of which there are about 700, are fearful lest they be left out in the cold by this consolidation process, and there is practically not a doubt that they will be able to convince Congress that their interests and the interests of the communities and industries dependent upon them should be protected. The Short Line Association desires a provision in the Transportation Act, in accordance with which such short lines as desire to be absorbed must be taken over by a connecting trunk line on terms to be fixed by the I. C. C., if the respective security holders cannot agree as to price. This provision will be no injustice to anyone, but puts a very great burden on the commission which must decide which of these short lines are essential to the public; some may be entirely unnecessary, while others are necessary to the public to the extent of anywhere from 5 per cent to 100 per cent—each case differs. Much new ground will have to be broken from a technical and legal point of view.

Motor Buses

One of the outstanding developments of the year 1925 has been the activity which many of the railroads have displayed to meet the bus problem. Several of the railroad companies, visualizing the necessity of controlling the situation, have gone into the motor bus business in a large way. The outstanding examples are the Boston & Maine, New York, New Haven & Hartford, the Reading Company and the Great Northern.

A bill will be introduced in Congress, giving authority to the I. C. C. to regulate interstate traffic on the highways. This is an absolutely logical development in view of the fact that some of the states have already tried this and have struck a variety of legal limitations and snags.

The public must be served in the best manner possible, in the most efficient and economical way. Very frequently economy is achieved only after a great amount of unnecessary waste. In the end, the most economical and efficient way to serve the public will be for the railroads to run bus lines on parallel highways, as well as at right angles to their lines; passengers may then ride in a bus while they check their trunks or baby carriages by train. In the Northwest it may be found to be most efficient to take off branch line trains between April 1 and October 15, serving the public with buses during this period and taking off the buses during the winter months, when local trains can serve most efficiently on account of weather conditions.

Motor Truck Service

Motor truck service by railways and by others is displacing more and more local trains, but there is much waste in the private truck service of firms like the large department stores and furniture houses, which distribute their own merchandise within a radius of 50 miles, bringing the trucks home empty. Sooner or later all this traffic will have to be co-ordinated so as to be carried on the most economical basis. This in turn raises two other complex problems, that of store-door delivery and highway regulation.

It seems absurd that the local merchant should deliver his freight to a local freight station which was built in the days of the horse, and is, therefore, adjusted to the horse days; that then the motor truck should pick up this freight and deliver it to another local freight station, from whence again it is to be picked up. Store-door delivery will have to come, certainly in the smaller communities and will probably gradually spread to the larger cities.

As for highway regulation, the time is not far off when many of the smaller and even the larger communities will object to the heavy through traffic on their streets, which makes them, if anything, more dangerous than the railway crossings. Belt lines going around, instead of through towns and the elimination or separation of highway crossings will be demanded.

Railway motor cars have shown great development during the year. Two outstanding types seem to have been developed; one by the Canadian National Railways and the other by the Brill interests. An increase in passenger traffic may be expected from the use of these cars for both branch lines and light main line service.

Long and Short Haul Clause

With the growth of the intermountain territory and the rapid development of cities like Phoenix, Salt Lake City, Boise City, Spokane, etc., this question is coming more and more to the front and will have to be adjusted on a basis reasonably satisfactory to the people of this section. It is perfectly natural to imagine the point of view, or rather the resentment of shippers who see heavy freight trains pass through their town, destined to points 500 or 1,000 miles beyond, with a mountain range between, hauling freight at rates substantially lower than they are paying. In order to solve this problem something radical must be done. A sentiment is therefore developing to give the I. C. C. control of the intercoastal shipping rates, so as to enable it to adjust the rates between the steamships and the railroads and to put the intermountain territory at least on a parity with points hundreds of miles beyond.

Adjusting vessel rates is a very large order. How much profit are the owners of the shipping lines entitled to? Presumably if they are public servants they would not be entitled to a greater profit than the railroads, after allowing for the necessarily greater depreciation charges. If vessels are supposed to earn only about 6 per cent on their cost, they will probably be largely withdrawn. In such an event the Pacific Coast would have very low freight rates on intercoastal traffic, but there would not be many ships to handle the business. If vessel rates should be very remunerative and the surplus above 6 per cent is divided with the government, it is not impossible that a large amount might become available to be paid to the railways as compensation for putting the intermountain territory on a parity with Pacific Coast ports. If the intercoastal shipping traffic should be very profitable, there will be a rush on part of owners of vessels of American registry to get into it, and the commission would have to limit the number of ships. Again, we have a vista of new pitfalls and problems, with as usual, much to be said on both sides.

Within the next few years, another short and long haul problem is certain to develop in the state of Florida. Miami is getting deep water and other places in Florida are being developed into ports by the piercing of the sandbar between the Indian river and the ocean and the construction of breakwaters. When the reaction in Florida takes place and there arises the consequent shrinkage of traffic, all these Florida ports will have substantially the same water rates from North Atlantic ports, and therefore, rates to the interior of Florida will have to be based on either Miami or Jacksonville. This situation will cause headache not only to the Florida rate clerks but also to the security holders of Florida railways.

The Rate Problem

The steamship companies on the Atlantic and Gulf coasts have heretofore worked in harmony with the railways and have not indulged in rate-cutting campaigns, but the regulation of part of our coastwise shipping—that is, of intercoastal shipping—can hardly be turned over to the I. C. C. without giving it authority to handle all of it. Presumably canal rates will be treated likewise. Those who do not approve of regulation will cry out against this increase of bureaucratic power; while others who believe regulation of rates to be necessary will realize this extension of power to be a logical sequence. The objectors should not be merely negative, but should offer constructive suggestions on the problem of rail and water competition and the locally abhorrent long and short haul problem.

The railroads in the Northwest have probably made out an excellent case for their needs for larger income but they have not shown the commission how this desirable object can be achieved. The 5 per cent horizontal increase does not necessarily mean a 5 per cent increase in revenue, because higher rates may drive away some traffic to the Panama canal and to the motor trucks. Furthermore, there is the sting or political sugar in the Hoch-Smith resolution protecting the agricultural interests. Recently on one day several hundred trucks delivered live stock at the South St. Paul stockyards, and it is claimed that this was done more cheaply than would have been possible by rail. Probably the shippers of this stock really do not know the exact cost of this service, but at any rate if it can be done cheaper by motor truck, the railways as a whole would probably be better off not to handle this unprofitable business.

The Interstate Commerce Commission is the instrument of Congress, to which Congress has delegated certain of its constitutional powers. As the mere creature of Congress, the commission is naturally loath to violate the very indefinite instructions given to it by Congress.

The difficulty about the Northwestern rate situation is, that the railways have not been able to agree among themselves on a course of action. It was suggested that certain class rates should be advanced. Naturally, the shippers of these particular commodities objected. Some, or most railways never have backbone enough to stand up against their large shippers and therefore Line *A* will at the urge of the large shippers withdraw the suggestion for an advance, on say packing house products. Line *B* will weaken on lumber and Line *C* will weaken on some metal and in the end, not being able to agree, they expect the commission to solve their problem. As a matter of fact the rate proceedings before the commission are usually dominated by the men who appear on behalf of the various trade interests. The cement interests, for example, know infinitely more about the rate structure on their commodity than the men who represent the railroads. The representatives of the railroads are in many cases lawyers, who no doubt are thoroughly familiar with every phase of the law, but cannot meet highly specialized rate men on their own ground; or they may be traffic men who as a rule know their own particular territory only and are not able to cope with their very much better informed antagonists.

It is frequently amazing to read in one's morning paper the jeremiad delivered at a rate hearing of the I. C. C. by the representatives of an alleged tottering and decrepit industry, and to read in another column the letter of a president of a company engaged in the same line of industry, addressed to bankers offering securities of his company. These letters more or less always recite the buoyant condition of the industry and how the company started about 31 years ago in a shanty with a working capital, possibly borrowed, of $3,100 and now does a national or international business with assets running up into many millions.

The specialist in rate chiseling at the I. C. C. hearings generally states that if he does not get a reduction of one or two cents, his concern will have to go out of business. He is usually quite ready to prove that the valuation on which the railways want to earn interest is excessive and that the railway companies should not be entitled to any revenue on the cost of their development, but only on the bare cost of the property less depreciation.

What the railroads need, in order to get more revenue is less of the spirit of suspicion towards each other and more backbone and thorough knowledge of the other fellow's problem.

Southeastern Rates—In the Southern territory the railways are showing now a return of more than 6 per cent

on their tentative value. Presumably a reduction of rates in that territory is therefore quite likely.

Valuation

The recent decision of the United States District Court in Los Angeles in the Los Angeles & Salt Lake Railroad case seems to have been grossly misunderstood, based on incomplete reports of the decision. A perusal of the court decision shows that the I. C. C. put an inadequate valuation of $45,000,000 on this property, because it had not taken all the factors into consideration. This decision probably means that many elements of value, such as contract right, possibly development costs, etc., were not sufficiently considered. No doubt this same point will apply in many other valuations. The matter of the difference between 1914 and present values and the question of depreciation is still to be thrashed out in the courts.

Summary

To sum up, if the matter of control of interstate motor and ocean rates and the issuing of certificates of convenience and necessity to motor buses and motor truck lines, is to be "wished" on the Interstate Commerce Commission, greatly increased appropriations for it will become necessary and also an organization which can handle many of these problems which are strictly local. The work of the commission may have to be divided into districts something like the Federal Reserve Bank districts. This may require subsidiary local commissions.

If the building industry declines during 1926, this will mean a decrease in traffic in many commodities. The railroads will have to bestir themselves in order to further improve their management and to cut expenses. Railroad management has done wonders of late in expediting car movement and in the reduction of fuel and other expenses. The greatest possible savings are probably in the handling of less than carload business through the local freight house. This business constitutes about 6 per cent of the freight traffic and costs probably more than 25 per cent of the station expenses, and also at least 10 per cent of transportation expenses.

Constructive work on a broad scale in this direction is necessary. Whenever something new is suggested to most railroad managements there is not only the usual bureaucratic resistance, but competitive resistance. A large company may be weak in a given city and in hope of obtaining an advantage, may be willing to introduce some improved method at that particular point and thus get the best of its competitors there. In a neighboring city the relation of these same two companies may be reversed and then the first company will be opposed to this same method.

It is up to all railway officials to co-operate for their mutual interest and to stand up solidly for their meager rights to earn the permissible fair return of 6 per cent granted to them by the law, when most of the industries which violently protest against rate advances are showing enormous profits. If the strong railway companies and the strong men in the railway profession do not want to pool their earnings, they must at times forego petty and imaginary competitive benefits and pool their energy for their mutual benefit.

DURING the month of November there were 269 accidents on Canadian railways resulting in the deaths of 18 people and injury to 288. There were no passengers killed but three employees and 15 others met death. Among the injured were 24 passengers, 204 employees and 60 others. Automobiles were involved in 27 of the total 32 crossing accidents, which accounted for 5 persons killed and 40 injured, of the total of 6 killed and 44 injured in all the crossing accidents. There was some form of protection at 6 of the 32 crossings, the other 26 being classified as unprotected.

The Problem of the Color-Blind*

By Archibald E. Chace, B.A., M.D., F.A.C.S.

THE human eye, to distinguish colors, must "tune" to electro-magnetic waves having a total range one billionth that of the broadcast radio range, so it is not surprising to find many defects of color sensation in man.

Not only may the whole of the retina of both eyes be totally color-blind, but small spots alone (scotomata) may be color-blind, and when such a spot happens to be over the point of central vision, it is extremely important not to miss it when examining the man for train, yard, and engine service. So too, one eye may be color-blind, and the other normal; and these three possibilities are further multiplied by blindness to certain portions of the solar spectrum only, usually classified under six heads, making eighteen types. Still further, color defects may be from birth or acquired from disease or injury later; temporary or permanent; quantitatively the eye may have weak or normal perception for colors important in railway work; or the employee may be color ignorant or he may be aphasic; making a total of two hundred eighty-eight kinds of color defects.

To further complicate the situation, the color-blind frequently have a remarkable sense of small differences in *intensity* of light, by which through experience they are able under familiar conditions to name colors they do not see.

To sort out the dangerous from the safe in color sense is not the simple task usually assigned to a physician, without special training, and a few worsted skeins. No one knows how many serious accidents on the American railways have been caused by improper examinations.

Long since the men responsible for color sense examinations on European railways have recognized that this type of examination eliminates only fifty per centum of the dangerously color blind.

To date, at least one hundred pieces of apparatus have been invented to test color sense. Of these, at least two kinds are essential to every examination. One is a lantern with various diaphragms, glasses transmitting the same wave lengths as the roundels used in signals, certain confusion glasses, and screens to represent rain, fog, smoke and to cut out certain wave lengths (such as the shorter red waves). The other is some form of simultaneous contrast test (such as Stilling's plates) to differentiate color ignorance and aphasia. If this work is to be done by several people, it should be carefully planned and checked.

Field tests as usually conducted are of little value. The plea for working conditions is a good one, but field tests are not made under working conditions unless made by one thoroughly familiar with each of the 288 possible defects, with proper apparatus, at proper distances, with controls, under all background conditions, and in steam, rain, fog, smoke, daylight and night, twilight or dusk, by a method planned in advance to cover all of the 288 possibilities.

Not all men who are partially color-blind are dangerous. The man should see with each eye all of the spectrum, with the possible exception of orange. He should not have a central color scotoma, or be markedly weak in any color, or be color ignorant or aphasic. Shortening of the red end of the spectrum should be positively eliminated.

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*Abstract of an article on "The Color-Sense and the Railway," by the chief surgeon of the St. Louis Southwestern.

General News Department

The Canadian Railway Club will hold a meeting on January 12 at the Windsor Hotel, Montreal, at which meeting Lt. Col. Scott William, manager traction department, Mussens, Ltd., Montreal, will present a paper on air transportation. Moving pictures and slides will be shown.

The Interstate Commerce Commission has extended from January 1, 1926, to July 18, 1926, the effective date for the completion of the installation of automatic train control on the New York, Chicago & St. Louis required by the commission's order of June 13, 1923.

The annual meeting of the Cleveland Steam Railway will be held on January 4 at the Hotel Cleveland. Entertainment will follow the election of officers which will take place at this meeting. The February meeting will be held on February 1, at which time the 1926 A. R. A. Rules will be discussed.

The Railroad Owners' Association, J. D. Shatford, chairman, has addressed a letter to a large number of prominent railway executives proposing a plan for the erection of a building in Washington to be known as the Railroad Owners' Forum, or some similar and significant name, to house railroad offices and also educational exhibits pertaining to railroad transportation. It is proposed to finance the building by subscriptions from railroad stockholders.

The Chicago, Indianapolis & Louisville has applied to the Interstate Commerce Commission for an extension of time from February 1, 1926, to July 1, 1927, in which to complete the installation of automatic train control required under the commission's second order. The petition states that the Sprague device has been selected for the first installation and that it was necessary to make many changes in the application of the device to the railroad.

Railway Bills in Congress

Representative Rayburn of Texas has introduced a bill, H. R. 5,572, to amend the commerce act to provide that the Interstate Commerce Commission shall take judicial notice of reports, statistics, tariffs and other documents kept in its office, and published statistics, reports, etc., of other governmental bodies, to avoid the necessity for filing copies for the record in proceedings before the commission. The bill names a long list of documents which may be declared to be public documents and received as prima facie evidence of what they purport to be for the purpose of investigations by the commission and in judicial proceedings.

Representative Dyer has introduced a bill to amend the act relating to the liability of common carriers to their employees so as to provide that no action shall be maintained thereunder unless commenced within two years from the day the cause of action accrued. Representative Fulmer has introduced a bill to direct the Interstate Commerce Commission to establish and enforce preferential rates on shipments of cotton based upon the cubic contents of the bale.

Monthly Locomotive Inspection of I. C. C.

The Bureau of Locomotive Inspection of the Interstate Commerce Commission in November inspected 7,644 locomotives, of which 3,225 were found defective and 288 were ordered out of service, according to the monthly report of the commission to the Senate on the condition of railroad equipment. The Bureau of Safety during the same month inspected 109,026 freight cars, of which 3,820 were found defective; and 2,111 passenger cars, of which 21 were found defective. Duding the month 20 cases, involving 56 violations of the safety appliance acts, were transmitted to various United States attorneys for prosecution.

Quebec Prepares Appeal to Keep Ontario's Railway Out of Rouyn Goldfields

Premier L. A. Taschereau, of the Province of Quebec, announced last week that the provincial government had completed steps whereby it will appeal to the Privy Council in London from the decision of the Supreme Court of Canada which said that the Dominion government might give consent to the Nipissing Central Railway, a subsidiary of the Temiskaming & Northern Ontario (owned and operated by the Ontario government), to build across Crown land in northwestern Quebec to the new goldfields of Rouyn. As the Quebec government is party to an agreement whereby a branch of the Canadian National is now being constructed from O'Brien, on the National Transcontinental, 50 miles south to Rouyn, it will make every effort to stop any move at competition. The appeal will come before the Privy Council next spring and Charles Lanctot will plead the case for the province. It was also stated by Premier Taschereau that rapid progress is being made in building the railway into Rouyn.

Railways to Join Brotherhoods in Labor Legislation Program

The committee of executives considering proposed legislation to provide new machinery for the adjustment of complaints and controversies over wages or working conditions, was instructed to perfect the proposed measure in detail in co-operation with representatives of the four major brotherhoods by the Association of Railway Executives at a meeting in Chicago on December 21. This action was taken after considerable discussion. Representatives of the executives have already conferred at length with representativs of the brotherhoods, the decision of the association being an authorization for them to carry their negotiations to a conclusion. The expectation is that the proposed legislation approved by the railways and the major brotherhoods will be in form to be presented to Congress at an early date.

At a meeting of the board of directors of the American Railway Association which followed the meeting of the Association of Railway Executives, a report was made of the ten new operating records which were established in 1925 by the railways of this country which handled the largest freight traffic in history with practically no car shortage or transportation difficulties. These records comprise new high marks for freight loadings in one month, freight loadings for one week, average daily movement of freight cars, loadings of merchandise and miscellaneous freight, movement of freight cars per day, average load of freight per train, and savings of fuel and have been reported in previous issues of the *Railway Age*.

Particular attention was paid to that part of the report of the Car Service division referring to the transportation situation that now exists in Florida and to steps that have been taken to obtain the maximum efficiency in transportation there. A division of the Shippers' Regional Advisory Board for the southeastern Atlantic states has just been formed to deal with the situation in Florida alone.

THE CONSTRUCTION of railway between Thessaly and Epirus, Greece, will commence shortly, according to a decision by the Greek government. The present line from Volo to Kalabaka will be extended to Janina, the capital of Epirus, through the pass of Metsovo, once the highway between Constantinople and the west. At present, owing to lack of communication, Epirus is comparatively undeveloped.

Direct sleeping car service from Madrid to Cadiz has been established by the Spanish Transatlantic Steamship Company for the convenience of through passengers on ships of the Transatlantic Line proceeding to Argentina and Brazil. It is understood that the steamship company plans to place similar services at the disposal of passengers for Cuba, New York, and other American ports.

Freight Operating Statistics of Large Steam Roads—Selected Items for October, 1925,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross. Excluding locomotive and tender	Ton-miles (thousands): Net. Revenue and non-revenue	Average number of locomotives on line daily: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany 1925	404	247,074	274,659	37,299	5,524	71.4	275,471	108,097	116	18	13.1	3
1924	394	273,399	291,433	29,919	5,388	68.6	282,507	111,145	124	21	14.3	...
Boston & Maine 1925	2,319	532,163	621,529	58,373	14,295	73.5	691,458	279,008	340	100	22.7	50
1924	2,348	540,356	621,143	64,187	13,821	71.5	692,522	286,817	333	123	27.0	38
N. Y., New H. & Hartf 1925	1,892	492,403	515,988	38,843	14,572	72.2	703,952	285,849	298	44	12.9	39
1924	1,953	487,519	516,117	31,571	13,441	72.2	672,190	287,254	312	60	16.1	39
Great Lakes Region:												
Delaware & Hudson 1925	875	301,153	416,608	51,905	8,697	70.8	504,908	250,750	260	39	13.1	120
1924	888	378,094	502,970	46,384	10,457	68.3	650,557	335,596	253	36	12.3	79
Del., Lack. & Western 1925	993	587,303	662,168	77,501	18,372	70.3	969,301	391,499	296	58	16.4	67
1924	993	633,188	739,316	106,943	19,887	68.6	1,127,321	503,879	303	62	17.0	29
Erie (inc. Chic. & Erie) 1925	2,325	1,087,835	1,189,822	128,610	40,451	62.2	2,385,894	915,602	599	95	13.7	179
1924	2,325	1,105,964	1,232,515	126,420	42,486	67.2	2,515,278	1,122,143	665	93	12.2	131
Lehigh Valley 1925	1,346	603,008	663,259	109,902	19,606	68.9	1,097,981	484,974	416	91	18.0	118
1924	1,357	659,132	726,356	94,811	20,756	66.0	1,240,280	575,427	471	74	13.5	109
Michigan Central 1925	1,826	584,734	600,628	18,063	20,716	67.9	1,063,224	398,778	299	46	13.3	107
1924	1,827	585,481	596,852	22,992	19,243	66.1	1,045,670	411,658	311	61	16.5	88
New York Central 1925	6,478	2,362,537	2,664,097	196,585	88,664	63.7	5,331,847	2,316,883	1,154	359	23.7	207
1924	6,447	2,187,958	2,474,221	177,404	81,546	65.0	4,834,831	2,156,882	1,273	349	21.5	347
New York, Chic. & St. L. 1925	1,669	720,340	728,893	9,051	23,115	68.6	1,219,932	478,427	229	73	24.2	31
1924	1,669	684,615	697,472	6,799	21,850	69.6	1,168,698	477,864	246	63	20.4	45
Pere Marquette 1925	2,198	469,472	479,607	7,441	12,362	67.7	698,317	325,752	192	21	10.0	10
1924	2,227	419,750	433,992	10,383	11,327	71.3	598,865	281,333	197	21	9.4	32
Fitts. & Lake Erie 1925	231	134,401	137,924	1,869	4,565	64.4	345,812	199,983	71	13	15.5	33
1924	231	130,996	135,909	1,300	4,434	63.2	344,924	204,012	70	19	21.0	10
Wabash 1925	2,497	787,666	822,243	16,518	25,198	72.3	1,331,333	558,275	330	51	13.3	51
1924	2,460	708,824	746,639	12,636	22,798	73.4	1,212,639	527,379	301	56	15.6	29
Central Eastern Region:												
Baltimore & Ohio 1925	5,196	2,138,264	2,519,111	202,206	64,704	65.6	4,170,239	2,056,848	1,007	259	20.5	23
1924	5,207	2,011,375	2,315,513	179,419	58,341	64.4	3,649,657	1,773,231	987	306	23.7	96
Central of New Jersey 1925	691	269,733	298,398	40,338	6,969	64.7	411,320	192,880	238	36	13.1	61
1924	692	296,741	325,455	38,175	7,702	61.9	494,627	238,815	234	42	15.2	43
Chicago & Eastern Ill. 1925	945	267,291	268,025	4,522	7,983	66.5	473,641	231,724	139	27	16.1	52
1924	945	253,810	255,656	4,285	7,169	64.8	429,391	210,770	127	32	20.1	38
Cleve., Cin., Chic. & St. L. 1925	2,381	781,757	822,936	28,774	25,398	64.5	1,602,435	772,862	328	92	21.8	20
1924	2,387	775,394	829,165	15,873	25,051	62.8	1,612,290	787,594	339	96	22.0	38
Elgin, Joliet & Eastern[1] 1925	460	124,606	132,357	5,479	3,931	67.5	286,151	153,573	69	18	21.1	...
1924	460	111,710	119,961	4,673	3,526	66.0	262,210	141,390	79	19	19.3	16
Long Island 1925	393	48,091	52,432	13,115	661	59.6	40,257	15,316	43	8	15.3	1
1924	393	49,263	51,277	8,200	716	60.0	43,649	17,505	43	15	26.3	5
Pennsylvania System 1925	10,872	4,905,123	5,320,652	408,212	146,060	65.8	9,425,454	4,518,241	2,720	646	19.2	228
1924	10,942	4,754,207	5,140,411	381,227	138,760	65.3	9,022,896	4,389,566	2,689	822	23.4	201
Reading 1925	1,132	627,233	689,622	70,908	17,232	62.8	1,140,213	577,617	389	86	18.1	142
1924	1,141	662,413	731,193	74,756	17,216	64.4	1,147,638	598,681	417	80	16.1	115
Pocahontas Region:												
Chesapeake & Ohio 1925	2,627	1,262,951	1,327,819	45,378	41,130	58.5	3,177,233	1,737,717	484	106	17.9	6
1924	2,555	1,144,390	1,226,968	39,145	36,340	57.0	2,837,475	1,552,670	462	102	18.1	6
Norfolk & Western 1925	2,231	948,647	1,155,901	40,023	32,281	61.3	2,624,319	1,433,858	585	52	8.2	124
1924	2,230	936,705	1,115,924	35,744	28,805	60.7	2,317,164	1,247,412	578	99	14.7	143
Southern Region:												
Atlantic Coast Line 1925	4,900	880,395	912,303	15,572	22,474	64.4	1,235,502	494,502	385	59	13.3	21
1924	4,865	684,947	698,894	12,282	17,529	68.1	907,941	386,009	401	51	11.3	71
Central of Georgia 1925	1,907	388,231	391,524	9,132	8,635	70.9	464,716	210,401	147	17	10.2	10
1924	1,907	332,327	334,012	5,023	7,456	74.8	386,145	179,618	135	17	11.1	10
I. C. (inc. Y. & M. V.) 1925	6,225	2,039,354	2,055,772	40,198	59,379	67.1	3,586,134	1,601,680	741	102	12.1	15
1924	6,198	1,851,438	1,872,535	41,157	56,751	67.6	3,401,814	1,546,544	765	117	13.2	35
Louisville & Nashville 1925	5,027	1,955,650	2,090,156	63,652	38,626	62.6	2,549,038	1,245,003	614	101	14.1	3
1924	5,026	1,822,001	1,941,321	68,025	35,836	62.4	2,382,204	1,173,022	624	102	14.0	24
Seaboard Air Line 1925	3,767	596,569	616,548	16,883	15,382	67.8	827,611	339,509	242	21	8.0	...
1924	3,547	480,492	499,727	9,412	11,848	70.6	614,988	259,050	213	39	15.6	6
Southern Ry. 1925	6,857	1,633,876	1,683,860	39,043	40,036	70.0	2,129,163	893,365	832	118	12.4	55
1924	6,840	1,470,554	1,506,117	34,129	35,489	71.9	1,850,169	782,701	880	109	11.0	38
Northwestern Region:												
Chic. & North Western 1925	8,462	1,784,386	1,843,587	28,579	44,707	62.2	2,621,540	1,081,144	745	202	21.3	66
1924	8,463	1,811,634	1,876,457	38,063	44,829	65.0	2,583,356	1,097,789	774	254	24.7	70
Chic., Milw. & St. Paul 1925	11,201	1,829,574	1,965,417	99,974	55,770	67.1	3,100,782	1,343,399	910	195	17.6	94
1924	10,983	1,856,287	1,954,007	84,502	53,893	65.8	3,124,824	1,422,058	961	162	14.4	86
Chic., St. P., Minn. & Om. 1925	1,726	356,853	383,818	15,681	7,509	69.5	399,820	167,947	166	36	17.9	2
1924	1,726	396,496	423,517	16,884	8,277	75.7	439,678	200,545	167	38	18.7	3
Great Northern 1925	8,232	1,210,323	1,254,592	61,070	42,515	65.9	2,519,258	1,119,305	639	114	15.2	57
1924	8,251	1,370,041	1,405,776	59,298	44,869	64.3	2,773,729	1,311,612	649	121	15.7	38
M., St. P. & S. Ste. M. 1925	4,372	651,714	671,325	9,445	16,665	73.0	858,856	406,046	308	34	10.1	13
1924	4,374	741,774	755,669	7,875	18,609	66.3	1,041,271	495,844	305	38	11.1	1
Northern Pacific 1925	6,522	1,078,311	1,133,671	60,973	34,146	69.0	1,924,803	843,940	524	132	20.1	49
1924	6,447	1,130,735	1,180,027	59,008	34,022	64.4	2,053,664	927,286	581	149	20.4	64
Oreg.-Wash. R. R. & Nav. 1925	2,185	227,173	247,313	27,278	6,744	71.7	378,833	171,696	139	23	14.0	2
1924	2,185	239,299	258,382	25,707	6,761	69.7	391,891	179,358	148	27	15.5	13
Central Western Region:												
Atch., Top. & S. Fe (incl. P. & S. F.) 1925	10,045	2,361,518	2,607,006	182,172	79,206	62.7	4,725,931	1,538,122	844	153	15.3	82
1924	9,979	2,094,435	2,264,100	134,994	66,914	63.9	3,926,288	1,354,226	837	173	17.1	94
Chicago & Alton 1925	1,022	354,428	385,414	6,920	8,682	62.4	540,394	221,305	135	25	15.8	19
1924	1,022	381,321	392,473	4,610	9,155	62.8	551,736	230,032	125	24	16.0	7
Chic., Burl. & Quincy 1925	9,338	1,841,849	1,920,688	78,358	55,071	63.3	3,227,555	1,453,258	817	193	19.1	54
1924	9,340	1,891,639	1,968,294	85,294	55,082	62.9	3,310,692	1,519,799	843	177	17.4	35
Chic., Rock I. & Pacific 1925	7,561	1,405,694	1,458,888	18,002	36,395	68.6	1,948,351	817,452	554	156	22.0	56
1924	7,595	1,473,050	1,514,943	14,149	37,960	70.4	2,037,174	894,646	586	185	24.0	47
Denver & R. G. Wn. 1925	2,577	412,482	497,696	94,632	10,602	65.9	598,816	249,493	263	42	13.6	8
1924	2,609	395,068	493,280	93,303	9,379	66.8	522,122	227,908	263	54	16.9	8
Oregon Short Line 1925	2,444	484,048	503,820	28,282	12,726	63.4	782,773	324,577	203	29	12.3	20
1924	2,383	396,502	413,551	24,110	10,233	62.7	627,226	261,542	211	27	11.4	39
Southern Pac. (Pac. Sys.) 1925	8,511	1,883,325	2,079,576	338,244	59,525	66.0	3,492,922	1,338,001	786	172	17.9	32
1924	8,519	1,612,734	1,772,460	272,301	49,027	67.7	2,841,811	1,161,844	779	207	21.0	81
Union Pacific 1925	3,688	1,879,328	1,936,783	110,322	61,754	65.9	3,512,718	1,231,510	501	47	8.6	45
1924	3,732	1,428,942	1,455,098	63,021	47,940	65.3	2,734,768	1,006,128	507	53	9.5	67
Southwestern Region:												
Gulf, Colo. & S. Fe 1925	1,897	299,565	310,397	7,323	9,124	65.0	532,665	225,048	118	30	29.3	15
1924	1,897	330,849	341,273	8,252	10,252	63.3	602,695	258,491	120	22	15.5	1
Mo.-Kans.-Tex. 1925	1,787	249,648	250,881	5,121	8,878	60.8	504,946	189,040	110	21	16.1	35
1924	1,787	270,733	272,376	6,907	9,451	64.7	526,994	214,391	134	30	18.4	51
Mo.-Kans.-Tex. of Tex. 1925	1,389	211,176	223,500	4,105	5,926	62.2	320,657	119,127	127	21	14.1	52
1924	1,389	255,879	266,155	6,984	7,068	62.0	397,190	154,437	107	13	10.6	21
Missouri Pacific 1925	7,278	1,455,231	1,488,899	41,201	41,139	66.9	2,339,844	1,008,361	574	93	14.5	5
1924	7,302	1,565,838	1,594,363	49,276	40,996	67.2	2,360,487	1,073,014	528	115	17.8	...
St. Louis-San Francisco 1925	4,819	980,960	1,002,184	15,774	22,047	64.9	1,251,098	510,366	435	67	13.4	11
1924	4,683	932,589	953,251	17,336	20,911	65.3	1,183,195	502,156	427	73	14.5	33
Southern Pacific Lines (in Tex. and La.)[2] 1925	4,427	740,926	741,161	4,897	17,338	65.6	974,114	394,767	267	64	19.4	37
1924	4,402	769,161	772,493	6,684	17,800	66.0	1,020,733	430,960	274	61	18.2	21
Texas & Pacific 1925	1,953	333,919	333,919	3,621	8,711	66.8	474,395	182,583	146	34	19.1	10
1924	1,953	319,905	319,905	5,352	8,366	70.3	450,919	188,620	153	42	21.3	22

[1]No passenger-train service. [2]Includes Franklin & Abbeville, Galveston, Harrisburg & San Antonio, Houston & Shreveport, Houston & Texas Central, Houston East & West Texas, Iberia & Vermilion, Lake Charles & Northern, Louisiana Western, Morgan's La. & Tex. R. R. & S. S. Co., and Texas & New Orleans.

Compared with October, 1924, for Roads with Annual Operating Revenues above $25,000,000.

Region, road and year	Average number of freight cars on line daily: Home	Foreign	Total	Per cent unserviceable	Stored	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per loaded car	Net ton-miles per car-day	Car miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles including locomotive and tender	Locomotive miles per locomotive day
New England Region:													
Boston & Albany....1925	2,110	6,689	8,799	2.5	....	1,115	438	19.6	393	28.3	8,628	194	75.4
1924	2,197	5,733	7,930	2.9	....	1,033	406	20.6	452	31.9	9,101	188	71.6
Boston & Maine....1925	12,427	15,812	28,239	9.5	....	1,299	524	19.5	318	22.2	3,881	144	49.9
1924	13,146	17,264	30,410	10.6	....	1,282	531	20.8	304	20.5	3,940	134	48.5
N. Y., New H. & Hartf...1925	18,764	22,505	41,269	19.2	254	1,430	581	19.6	223	15.8	4,874	132	52.4
1924	19,394	19,646	39,040	20.9	340	1,379	589	21.4	237	15.4	4,744	140	47.5
Great Lakes Region:													
Delaware & Hudson....1925	11,703	5,989	17,692	5.2	4,601	1,677	833	28.8	457	22.4	9,242	170	50.4
1924	8,770	6,365	15,135	7.6	....	1,721	888	32.1	715	32.6	12,191	176	61.3
Del., Lack. & Western....1925	16,606	10,136	26,742	3.0	728	1,650	667	21.3	472	31.5	12,724	164	67.3
1924	15,094	10,927	26,021	3.6	10	1,780	796	25.3	625	35.9	16,376	159	74.9
Erie (inc. Chic. & Erie)...1925	33,441	23,016	56,457	7.5	9,121	2,193	842	22.6	523	37.1	12,701	126	61.3
1924	32,169	23,984	56,153	6.1	4,627	2,274	1,015	26.4	644	36.3	15,271	125	57.8
Lehigh Valley 1925	21,132	10,465	31,597	6.9	3,525	1,821	804	24.7	495	29.0	11,626	144	49.2
1924	20,664	11,746	32,410	6.8	....	1,882	873	27.7	572	31.3	13,683	147	48.6
Michigan Central 1925	12,573	19,473	32,046	4.8	....	1,818	682	19.3	401	30.7	7,045	117	58.0
1924	11,402	17,894	29,296	5.3	36	1,786	703	21.4	453	32.0	7,270	118	53.8
New York Central....1925	54,084	76,976	131,060	4.4	2,682	2,257	981	26.1	570	34.2	11,538	119	61.0
1924	59,664	69,529	129,193	4.3	6,869	2,210	986	26.4	538	31.3	10,792	119	52.7
New York, Chic. & St. L..1925	9,158	12,291	21,449	5.4	222	1,694	664	20.7	719	50.6	9,249	119	78.7
1924	7,732	12,866	20,598	6.1	....	1,707	698	21.9	748	49.1	9,238	114	73.4
Pere Marquette 1925	7,456	12,640	20,096	4.0	....	1,487	694	26.4	522	29.3	4,780	112	73.8
1924	7,851	12,528	20,379	6.9	....	1,427	670	24.8	445	25.1	4,075	122	65.8
Pitts. & Lake Erie....1925	11,562	7,906	15,468	7.4	1,335	2,573	1,488	43.8	231	11.7	27,871	75	53.7
1924	12,879	8,237	21,116	4.3	1,505	2,633	1,557	46.0	312	10.7	22,433	72	50.3
Wabash 1925	11,853	13,539	25,392	2.7	100	1,690	709	22.2	708	44.2	7,212	135	71.1
1924	10,928	11,927	22,855	3.3	400	1,711	744	23.1	744	43.8	6,916	130	68.5
Central Eastern Region:													
Baltimore & Ohio....1925	65,632	48,091	113,723	7.2	873	1,950	962	31.8	583	28.0	12,769	168	69.3
1924	67,695	43,361	111,056	15.2	732	1,815	882	30.4	515	26.3	10,986	166	62.2
Central of New Jersey....1925	16,818	11,899	28,717	3.3	3,058	1,525	715	27.7	217	12.1	9,006	180	39.8
1924	16,539	11,275	27,814	4.4	2,298	1,667	805	31.6	277	14.4	11,133	177	42.5
Chicago & Eastern Ill....1925	12,107	5,021	17,128	21.4	591	1,772	867	29.0	434	22.5	7,909	137	53.1
1924	13,061	5,054	18,115	20.8	863	1,692	830	29.4	374	19.6	7,194	144	52.7
Cleve., Cin., Chic. & St. L..1925	13,546	21,350	34,896	4.9	1,166	2,050	989	30.4	713	36.3	10,472	125	65.4
1924	11,912	23,496	35,408	5.4	1,081	2,079	1,016	31.4	716	36.2	10,645	118	62.7
Elgin, Joliet & Eastern[1]...1925	9,112	7,302	16,414	6.7	447	2,296	1,232	39.1	302	11.4	10,774	134	51.1
1924	9,774	6,701	16,475	8.2	982	2,347	1,266	40.1	277	10.5	9,920	126	41.0
Long Island 1925	1,845	5,667	7,512	0.9	....	837	318	23.2	66	4.8	1,256	260	42.0
1924	1,707	5,401	7,108	1.3	78	886	355	24.4	79	5.4	1,436	253	33.0
Pennsylvania System 1925	196,932	94,947	291,879	10.1	6,560	1,922	921	30.9	499	24.5	13,406	132	54.9
1924	195,520	102,797	298,317	10.1	12,080	1,898	923	31.6	475	23.0	12,941	134	50.7
Reading 1925	21,021	17,975	38,996	2.4	1,534	1,818	921	33.5	478	22.7	16,465	151	51.7
1924	21,868	15,714	37,582	2.4	3,562	1,733	904	34.8	514	22.9	16,931	164	52.4
Pocahontas Region:													
Chesapeake & Ohio....1925	27,375	13,337	40,712	3.6	583	2,516	1,376	42.2	1,376	55.6	21,336	108	75.0
1924	24,914	14,926	39,840	5.9	699	2,480	1,357	42.7	1,256	51.5	19,602	110	72.4
Norfolk & Western....1925	26,842	10,543	37,385	1.8	....	2,766	1,511	44.4	1,236	45.3	20,729	143	60.5
1924	26,863	10,946	37,809	4.6	1,416	2,473	1,332	43.3	1,064	40.4	18,044	156	54.8
Southern Region:													
Atlantic Coast Line....1925	19,610	22,786	42,396	3.4	....	1,403	562	22.0	373	26.3	3,253	129	67.3
1924	19,485	11,005	30,490	4.7	....	1,326	564	22.0	400	26.7	2,560	126	50.7
Central of Georgia....1925	3,996	8,717	12,713	4.6	....	1,197	542	24.4	533	30.9	3,559	156	78.8
1924	4,063	4,887	8,950	6.9	....	1,162	541	24.1	646	35.8	3,039	153	72.0
I. C. (inc. Y. & M. V.)...1925	37,290	30,222	67,512	3.7	....	1,758	785	27.0	764	42.2	8,300	132	80.2
1924	38,532	27,603	66,135	4.6	....	1,837	835	27.3	753	40.9	8,049	127	70.1
Louisville & Nashville....1925	37,414	23,843	61,257	13.1	74	1,303	637	32.2	653	32.4	7,989	163	97.3
1924	39,243	20,319	59,562	14.2	103	1,307	644	32.7	633	31.0	7,529	157	89.4
Seaboard Air Line....1925	10,706	15,837	26,543	1.7	....	1,387	569	22.1	412	27.5	2,907	146	77.7
1924	9,607	8,004	17,611	5.4	....	1,280	539	21.9	475	30.6	2,356	149	65.2
Southern Ry. 1925	37,852	27,940	65,792	3.7	....	1,303	547	22.3	437	28.0	4,203	168	58.5
1924	37,260	22,945	60,205	5.1	....	1,258	532	22.1	419	26.4	3,691	171	50.2
Northwestern Region:													
Chic. & North Western....1925	46,122	31,757	77,879	9.3	1,975	1,469	606	24.2	447	29.7	4,122	138	63.8
1924	45,635	36,730	82,365	10.2	....	1,426	606	24.5	429	27.0	4,184	140	60.1
Chic., Milw. & St. Paul...1925	54,981	27,976	82,957	5.5	....	1,695	734	24.1	522	32.3	3,869	146	60.3
1924	52,800	32,438	85,238	7.5	....	1,683	766	26.4	537	30.9	4,177	142	58.6
Chic., St. P., Minn. & Om..1925	2,927	9,080	12,007	10.1	....	1,120	471	22.4	451	28.9	3,138	153	63.7
1924	3,564	10,967	14,531	9.2	1,195	1,109	506	24.2	445	24.1	3,748	145	69.3
Great Northern 1925	45,800	20,423	66,223	5.8	....	2,081	925	26.3	538	31.1	4,286	133	56.3
1924	47,931	22,707	70,638	4.6	....	2,025	957	29.2	595	31.6	5,128	127	61.4
M., St. P. & S. Ste. M...1925	19,710	8,447	28,157	3.6	1,782	1,318	623	24.4	464	26.0	2,996	116	64.2
1924	20,636	8,787	29,423	4.7	1,115	1,404	668	26.6	543	30.7	3,657	107	71.8
Northern Pacific 1925	33,629	11,487	45,116	6.0	....	1,785	783	24.7	601	35.3	4,174	142	58.8
1924	34,270	14,628	48,898	5.4	....	1,816	820	27.3	611	34.7	4,640	118	54.8
Oreg.-Wash. R. R. & Nav..1925	7,174	4,407	11,581	3.7	....	1,668	756	25.5	477	26.0	2,534	183	54.7
1924	5,569	4,788	10,357	3.4	....	1,638	750	26.5	559	30.2	2,648	184	52.3
Central Western Region:													
Atch., Top. & S. Fe (incl. P. & S. F.)....1925	51,854	19,502	71,356	4.8	6,942	2,001	651	19.4	693	56.9	4,940	121	90.3
1924	46,975	19,222	66,197	6.2	1,404	1,875	647	20.2	660	51.0	4,378	120	76.6
Chicago & Alton....1925	8,524	6,619	15,143	5.7	....	1,525	624	25.5	469	29.5	6,986	174	79.2
1924	8,340	6,638	14,978	4.0	....	1,447	603	25.1	493	31.3	7,261	153	85.8
Chic., Burl. & Quincy....1925	47,334	24,881	72,215	7.2	800	1,752	789	26.4	648	38.8	5,020	143	63.9
1924	46,204	27,278	73,482	7.7	....	1,750	803	27.6	666	38.4	5,249	146	64.9
Chic., Rock I. & Pacific....1925	30,693	22,857	53,550	11.0	4,024	1,386	582	22.5	484	31.5	3,487	158	67.1
1924	28,016	27,062	55,078	9.7	1,856	1,383	607	23.6	514	31.1	3,800	152	64.0
Denver & R. G. Wn....1925	10,988	7,386	18,374	3.5	1,442	1,452	605	23.5	437	28.1	3,123	214	62.7
1924	12,592	6,386	18,978	5.7	2,413	1,322	577	24.3	387	23.8	2,818	223	59.8
Oregon Short Line....1925	8,528	5,617	14,145	4.4	....	1,617	671	25.5	738	45.6	4,283	138	74.0
1924	6,761	4,911	11,672	6.5	....	1,582	660	25.6	723	45.1	3,540	145	59.2
Southern Pac. (Pac. Sys.)..1925	31,992	31,380	63,372	6.5	1,023	1,855	710	22.5	680	45.8	5,071	130	81.5
1924	28,163	28,781	56,944	6.1	2,933	1,762	720	23.7	657	46.9	4,399	136	66.9
Union Pacific 1925	15,805	14,440	30,245	8.0	....	1,869	655	19.9	1,311	99.7	10,773	126	120.4
1924	17,642	12,645	30,287	8.6	....	1,914	704	21.0	1,072	78.2	8,696	129	87.4
Southwestern Region:													
Gulf, Colo. & S. Fe....1925	8,829	5,022	13,851	2.9	622	1,778	751	24.7	522	32.6	3,827	109	68.8
1924	9,928	6,230	16,158	3.4	312	1,822	781	25.2	516	32.3	4,395	111	79.6
Mo.-Kans.-Tex. 1925	8,438	4,408	12,846	4.1	1,327	2,023	757	21.3	466	36.2	3,412	102	63.1
1924	9,393	6,675	16,068	4.4	....	1,947	792	22.7	425	29.1	3,870	101	54.8
Mo.-Kans.-Tex. of Tex....1925	282	10,568	10,850	8.2	703	1,518	564	20.1	339	27.6	2,766	114	49.6
1924	310	12,850	13,160	10.5	....	1,552	604	21.9	362	27.1	3,586	117	73.3
Missouri Pacific 1925	25,933	23,880	49,813	7.4	600	1,608	693	24.5	652	39.7	4,469	134	77.1
1924	24,402	28,206	52,608	7.6	....	1,507	685	26.2	658	37.4	4,740	140	82.5
St. Louis-San Francisco....1925	17,220	18,147	35,367	4.3	147	1,275	520	23.1	465	30.9	3,416	164	65.4
1924	17,134	15,755	32,889	4.9	306	1,269	538	24.0	492	31.3	3,459	159	62.6
Southern Pacific Lines (in Tex. and La.)[2]....1925	9,892	17,100	26,992	7.0	1,904	1,315	533	22.8	470	31.5	2,877	116	72.8
1924	9,717	19,398	29,115	5.9	1,930	1,327	560	24.2	477	29.8	3,158	117	75.2
Texas & Pacific....1925	5,833	8,406	14,239	5.1	....	1,421	547	21.0	382	28.3	3,016	124	60.5
1924	5,448	8,067	13,515	9.5	....	1,410	590	22.5	412	26.8	3,116	135	53.8

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

Traffic News

The Union Pacific will open a city ticket office on the first floor of the Otis building, 6 South LaSalle street, Chicago, on Monday, December 28.

The San Francisco-Overland Limited, operated between Chicago and San Francisco by the Chicago & North Western, the Union Pacific and the Southern Pacific, has been re-equipped throughout with an observation compartment, drawing room, sleeping car, a six-compartment three-drawing room sleeping car, four twelve-section one-drawing room sleeping cars and a buffet club car.

The Associated Traffic Clubs of America have petitioned all members of Congress for the repeal of the Hoch-Smith resolution, following the ratification by a majority of the 52 member clubs of a resolution opposing the resolution. The memorial says that this resolution is an expression of a wrong theory of rate making and also that if there was an agricultural depression it is now passing, or has passed.

The New Orleans relationship case, under which the Interstate Commerce Commission revised freight rates on commodities between Gulf ports and points in the interior to become effective April 7, 1926, will be given a re-hearing in New Orleans, La., on February 3, and in Ft. Worth, Tex., on February 10. It is charged by New Orleans interests that the order handed down by the Interstate Commerce Commission last summer gave the Texas ports an advantage in certain rates.

The rate hearing at Dallas, reported in the *Railway Age* of December 19, page 1166, will be resumed at Kansas City, Mo., on January 4. At Dallas, Sam Houston, traffic manager of the Texas Farm Bureau Cotton Association, testified that rates on cotton are higher than on other products in the southwest. The movement of cotton from the southwest to the southeast is all-rail, and to the northwest rail and water from the ports, he said. L. F. Daspit, of New Orleans, traffic manager for paper mills at West Monroe, La., and Orange, Tex., offered evidence to show that rates on paper products in the southwest should not be increased.

Chicago Railroads Accept and Oppose Suburban Fare Increase

Chicago railroads operating suburban service will not act in concert on the 15 per cent increase in suburban fares, recently authorized by the Illinois Commerce Commission. Some will accept the commission's ruling while others will challenge the 15 per cent increase and demand a 20 per cent increase as granted the Chicago & North Western by the Interstate Commerce Commission. The Illinois Central, the Chicago & Eastern Illinois and the Chicago & Western Indiana will oppose the 15 per cent increase, while the Chicago, Burlington & Quincy will accept the ruling, temporarily.

Pacific Fruit Express Will Purchase Cars to Meet Traffic Demands

In order to handle anticipated increased business the Pacific Fruit Express Company has been authorized by its owner companies, the Southern Pacific and the Union Pacific, to purchase 5,000 refrigerator cars to be delivered before September 1, 1926, and in addition to build 41 cars to replace cars retired from service during the past year.

The acquisition of this number of additional units will make available for the Pacific Fruit Express 38,375 refrigerator cars, an increase of 15 per cent. The purchase entails an additional investment of almost $16,000,000 and is being incurred to protect the peak load business originating during the months of September and October in territory served by the Union Pacific and Southern Pacific lines.

St. Louis-San Francisco Establishes Industries

A total of 401 new industries approximating a value in plant equipment of more than $2,000,000, were located on the tracks of the St. Louis-San Francisco during 1925, according to the annual report of C. W. Green, industrial commissioner. This is an increase of 25 per cent over 1924 of more than 60 per cent over 1923. Oil distributing plants located totaled 86, oil-well supply houses 59, oil loading racks 10, and oil refineries 9. Of the 401 industries, manufacturing companies totaled 331 and other companies included 56 material yards, 4 rock crushers, 6 grain elevators and 4 meat packing plants. A total of $380,000 was spent for industrial tracks to serve the new industries. Negotiations are now under way for the establishment of two large milk condenseries, one steel mill and two large sash and door glazing plants. Fifty-nine leases representing as many new industries are pending at this time.

Southeast Shippers' Advisory Board Meets in New Orleans

Business and industrial activity in the southeast during the first quarter of 1926 will be 10 per cent greater than during the first three months of 1925, according to reports made at the meeting of the Southeast Shippers' Advisory Board held at New Orleans, La., on December 11. The cement industry will require 15,300 cars during the first quarter of 1926, and the coal and coke committee estimates its requirements at 100 per cent of existing mine rating. The miscellaneous committee reported that building construction in the southeastern states this year will be 100 per cent greater than in 1924.

The sugar industry reported an estimated movement from the New Orleans district of 5 per cent over the same period of last year, while a slight increase is also anticipated in movements from Savannah. The grain and grain products industry expect a 10 per cent increase in business.

I. C. C. to Hear Proposal to Increase Western Class Rates

The Interstate Commerce Commission has decided that the application of the western roads that class rates in western trunk line territory be investigated as a part of the proceedings in Ex Parte 87 on their application for a five per cent advance in freight rates may be docketed as Ex Parte 87 Sub. No. 1 and to proceed with a hearing with respect to the class rates shortly after the close of the hearing in No. 17,000 and Ex Parte 87 now assigned for Kansas City commencing January 4. In all probability the first hearing with respect to the class rate situation will be assigned for some time in February. This information was conveyed in letters addressed by Chairman Aitchison of the commission on December 17 to R. N. Van Doren for the western roads and J. E. Benton for the western state commissions that had filed a motion in opposition to the carriers' application.

Mr. Aitchison said, however, that one of the grounds urged by the state commissions was that the carriers' petition does not contain the class rate proposal in definite form and that it appears only proper that the representatives of the states and of shippers should have definite information with respect to the proposals sufficiently in advance of the first hearing to enable adequate study thereof to be made. Accordingly the carriers were notified that they should present their proposals in definite form during the Kansas City hearing, not later than January 10, and distribute them to all parties to the case.

The Trans-Missouri-Kansas Regional Advisory Board Meets

The twelfth regular meeting of the Trans-Missouri-Kansas Regional Advisory Board was held on December 16 at Kansas City, Mo., with an attendance of 150 representatives of industry and railroads, who discussed the requirements for transportation for the next 90 days in the states of Missouri, Kansas, Oklahoma, Arkansas and Illinois. The Banking committee reported that conditions in all lines of industry and business are optimistic, labor being on the increase, largely on account of the activity in the building industry. The mercantile business in this district is

more active at present than it has been for the past three or four years. The Cement committee reported that the production and stocks of cement, both of which have exceeded last year by more than a million barrels, will continue large during 1926. The movement of hay to market this year has shown some increase over last year, and a heavy movement of hay to the market in this section is expected in January and February. The Livestock committee was of the opinion that a considerable number of cattle will be part fed and held over the winter for grazing next summer, due to the adequate supply of corn with its relative low price at this time. The hog receipts, it is estimated, will be approximately 15 per cent below last winter.

A committee of 11 representatives of the various industries of this section was selected to represent the board at a joint conference of the 12 regional advisory boards, which will be held in Chicago on January 7 and 8 to consider the formation of a national advisory board. The next meeting of the board will be held in St. Louis, Mo., on March 17, 1926.

Rock Island Launches Poultry Club Campaign Among Its Employees

As a method of improving the poultry industry in its territory, the Chicago, Rock Island & Pacific is organizing Rock Island Poultry Clubs among its adult employees whereby each member of these clubs, to be formed over the entire system, will be provided with 50 chicks of a new strain to be known as "The Rock Island Strain" of White Plymouth Rocks or White Wyandottes, and will compete in raising them. The chicks will be produced in a hatchery to be established on Rock Island property at Traer, Ia., where the new strain of poultry will be developed under the supervision of Professor W. H. Lapp, director of the research and extension department of the Live Poultry Transit Company, and former professor of poultry husbandry of the Ames (Iowa) Agricultural College. Branch hatcheries will be located at Grundy Center, Ia., and at Iowa Falls.

The plan provides that any adult employee may obtain from the hatchery 50 chicks, either to be purchased outright by the employee at 20 cents each, or the chicks will be furnished without cost, with the understanding in the latter case that the employee will turn back to the Rock Island 15 cockerels when the stock is matured, or during the period extending from October 15, 1926, to December 15, 1926.

Prizes will be awarded after the season's records are completed for the best records from the standpoint of neatness and accuracy, also for the best development of the stock from the standpoint of feeding. On receiving the chicks the employees will be furnished with necessary information on feeding and care.

The object of this campaign is to develop the production of quality poultry along the Rock Island lines, to establish a strain of poultry to be known as the "Rock Island Strain," to disseminate educational information pertaining to the management of poultry, to develop mutual interest in the business of raising poultry, and the quality production of eggs among the employees of the railroad.

The following prizes will be awarded to the employees who are regularly enrolled as members of the Rock Island poultry clubs: (1) $5 cash to one employee member on each operating division, or a total of 13 prizes of $5 each; (2) $5 cash to one employee club member from the general office headquarters at Chicago and at Ft. Worth, Tex., and the district general offices at Des Moines, Ia., and El Reno, Okla., or a total of four prizes of $5 each; (3) $5 cash to one employee club member from each of the forces in the office of, or reporting to, the general freight agents' organization at Chicago, Kansas City, Mo., Ft. Worth, Tex., and Little Rock, Ark., or a total of four prizes of $5 each; (5) $5 to one employee club member from each of the forces in the office of, or reporting to, the general passenger agents' organization at Chicago, Kansas City, Mo., Ft. Worth, Tex., and Little Rock, Ark., or a total of four prizes of $5 each; (5) $25 cash to the employee club member whose place of business is wholly or mostly in the territory covered by each operating district, or a total of two prizes of $25 each; (6) $50 cash to one employee club member on the entire system; (7) one system annual pass good for all dependent members of the family of the employee club member on each operating division (a total of 13), one to an employee of each general office (a total of 4), one to each general freight agent's territory (a total of 4), one to each general passenger agent's territory (a total of 4), or a grand total of 25 system annual passes.

Commission and Court News

Interstate Commerce Commission

Findings in Mail Pay Case Reaffirmed

The Interstate Commerce Commission, after reargument at the request of the Postmaster General, has reaffirmed its findings in cases involving the New England lines and certain short line railroads in the intermountain and Pacific coast territories in which it established higher mail pay rates as of the dates the applications were filed. The Postmaster General contended that the commission was without power under the law to make a finding or order with respect to rates, established by its orders as fair and reasonable, in effect during a period in which the service required by the Postoffice Department has been performed and paid for. Commissioners McChord, Esch, Lewis and McManamy dissented from the majority report, on the ground that the findings heretofore made as to rates in effect prior to the dates of the commission's orders fixing increased rates for the future, should be rescinded.

State Commission

Automatic Highway Crossing Signals in New York

The New York State Public Service Commission which recently issued rules for the installation of automatic flashing signals at crossings of highways and railroads, and which, since its action last June, has approved plans for the installation of large numbers of such signals, received recently from the Board of Supervisors of Monroe county a strong protest against the installation of such signals in the center of the highway, the protest being based on a specific case at Henrietta, about four miles south of Rochester, on the Lehigh Valley. The commission in its orders expressed preference for the location in the middle of the road as against a signal at one side; and the middle-of-the-road location was specified at Henrietta. The railroad has already begun the installation of the signal.

At Rochester on December 19 the commission held a hearing on the Monroe county complaint. The only testimony presented on behalf of the county was that of the county attorney and county and state engineers. The attorney read resolutions of the town board of Henrietta, the Henrietta Grange and the Rochester Chamber of Commerce.

George C. Wright, county engineer, having made tests with a dummy device, submitted photographs and gave data concerning the relative interference of a vehicle with a middle-of-the-road warning as compared with one located on the side. Mr. Wright was opposed to the center location generally as a menace to public safety. He thought that a possible collision between a train and an automobile was less objectionable than a possible collision with the warning device.

Howard E. Smith, resident engineer of the Bureau of Highways of the State Department of Public Works, also was opposed to any obstruction in the highway. Mr. Smith's Bureau has, however, approved the installation of center signals. Wilson E. Harger, assistant to Mr. Smith, also was opposed to any object in the center of the highway; but on cross examination he said that he believed that the signals being put in by the Lehigh Valley would be effective if they were to be continuously illuminated at night.

H. W. Lewis, signal engineer, appeared for the railroad company. He has 40 of these signals now installed, in the center of the highway; and his experience was that they were much more effective than signals located at the side. The Lehigh Valley has large numbers in both situations. His company has records of signals being hit by vehicles only three times, none of the three being a serious accident. Signals located at the side of the road have been demolished by automobiles striking them. So far as his records were concerned, Mr. Lewis had found that the side location was involved in more accidents than the center location.

The plan for the signal at Henrietta substantially conforms to the A. R. A. specification, two red lights in a horizontal plane

with a "cross buck"; the lights flashing alternately at about 30 times a minute. The concrete base is 5 ft. wide and 8 ft. long, pointed at the end which faces vehicles approaching the crossing. There is one signal on each side of the railroad, about eight feet from the nearest rail. The highway is widened so that there is a width of 12 ft. outside of the signal.

Personnel of Commissions

R. V. Taylor Appointed to I. C. C. to Succeed Commissioner McChord

President Coolidge on December 21 announced the resignation of Charles C. McChord as a member of the Interstate Commerce Commission and sent to the Senate the nomination of Richard V. Taylor, formerly vice-president and general manager and later federal manager of the Mobile & Ohio, to succeed him for the term expiring in 1929. Mr. Taylor has been mayor of Mobile, Ala., and is now mayor-commissioner of the Mobile. It is understood that Commissioner McChord submitted his resignation during a call at the White House for that purpose on December 19, and that he expects to engage in the practice of law in Washington. Mr. Taylor was born August 11, 1859, at Newbern, N. C., and was educated at Barton Academy at Mobile, Ala. He entered railway service in 1877 with the Mobile & Ohio as a clerk in the accounting department, and was consecutively in the service of that road until the termination of federal control. To November 26, 1888, he occupied various positions in the accounting department. From that date to October 1, 1904, he was general auditor. On October 1, 1904, he was appointed general manager, and on February 10, 1911, he was made vice-president and general manager. In 1918 he was appointed federal manager for the Railroad Administration of the Mobile & Ohio, Southern Railway in Mississippi, and the Gulf, Mobile & Northern.

R. V. Taylor

Charles C. McChord, who has submitted to President Coolidge his resignation as a member of the Interstate Commerce Commission, for the purpose of engaging in the practice of law at Washington, has been a member of the commission since 1910, having been re-appointed in 1915 and again in 1922. He was also chairman of the commission in 1915 and again in 1922. For some time he has been a member of Division I of the commission which has general jurisdiction over matters pertaining to valuation, safety, locomotive inspection, block signals and train control. Mr. McChord was born December 3, 1859, at Springfield, Ky., and was educated at Center College at Danville, Ky. He engaged in the practice of law and from 1886 to 1892 was prosecuting attorney at Springfield. In May, 1892, he was appointed a member of the Kentucky Railroad Commission, of which he became chairman. In 1895 he resigned and was elected a member of the Kentucky state senate, serving four years. He was the author of the bill popularly known as the McChord railroad bill, empowering the state commission to prescribe freight and passenger rates for railroads in the state. In 1899 he again became a member of the railroad commission by election and was made chairman. He was re-elected commissioner and chairman in 1903 and in 1910 he was appointed to the federal commission. During the war he was a member of the Railway Wage Commission and arbitrator of the War Labor Board.

C. C. McChord

President Coolidge on December 21 nominated to the Senate Thomas F. Woodlock for appointment as a member of the Interstate Commerce Commission. Mr. Woodlock is now serving on the commission under a recess appointment, his nomination while the Senate was in session last Spring not having been acted upon before the adjournment of Congress.

The Senate on December 21 confirmed the reappointment of Ernest I. Lewis as a member of the Interstate Commerce Commission for the seven-year term ending December 31, 1933.

United States Supreme Court

Transportation of Interstate Commerce Over Highways

State Statute Prohibiting Operation in Interstate Commerce Held Violative of Commerce Clause.

The Supreme Court of the United States holds that section 4 of chapter 111 of the laws of the State of Washington, 1921, prohibiting common carriers for hire from using the highways by auto vehicles between fixed termini or over regular routes without having first obtained a certificate of public convenience and necessity, "is a regulation, not of the use of its own highways, but of interstate commerce. Its effect upon such commerce is not merely to burden but to obstruct it. Such state action is forbidden by the commerce clause. It also defeats the purpose of Congress, expressed in the legislation giving federal aid for the construction of interstate highways."

A citizen of Washington wished to operate an auto stage line over the Pacific highway between Seattle and Portland, Ore., exclusively for interstate passengers and express. He obtained from Oregon the license prescribed by its laws, but was refused a certificate of public convenience and necessity by the Washington director of public works on the ground that, under the laws of that state, the certificate may not be granted for any territory which is already being adequately served by the holder of a certificate; and that, in addition to frequent steam railroad service, transportation facilities between Seattle and Portland were already being provided by means of four connecting auto stage lines, all of which held such certificates from the state of Washington. Decree of the federal district court for Western Washington, dismissing a bill brought to enjoin the enforcement of section 4 of the Washington act, was reversed. (See 295 Fed. 197, 203.)—Buck v. Kuykendall. Decided March 2, 1925. Opinion by Mr. Justice Brandeis.

The rule declared in the Buck case was applied in another case decided on the same day. A statute of Maryland prohibits common carriers of merchandise by motor vehicles from using the public highways over specified routes without a permit, which the Public Service Commission is authorized to grant, or to refuse if it "deems the granting of such permit prejudicial to the welfare and convenience of the public." Laws of Maryland, 1922, chapter 401, section 4. George W Bush & Sons Company's application for a permit to do an exclusively interstate business as a common carrier of freight over specified routes was denied. It was admitted, on demurrer, that, in refusing the permit, the commission had considered merely "whether or not existing lines of transportation would be benefited or prejudiced, and in this way the public interest affected." The plaintiff claimed it did not require a permit for exclusively interstate commerce.

It was held that the fact that the highways here were not constructed or improved with federal aid, as in the Buck case, made no difference. Bush & Sons Co. v. Maloy.

Mr. Justice McReynolds dissented in both cases, in a separate opinion, on the ground that the challenged statutes do not discriminate against interstate commerce.

Labor News

War Veterans on C. N. R. Organize— Would Abolish Seniority

An organization composed of Great War veterans in the employ of the Canadian National Railways in Montreal has recently been formed for social and mutual benefit purposes, and will bear the name of Canadian National Veterans' Guild. Similar guilds will be formed throughout the Dominion, the next to be located at Winnipeg. The following are the officers of the Montreal Guild: president, Captain F. H. Morgan; vice-president, C. J. Rowe; secretary, T. Lewis; treasurer, E. O'Brien.

During the recent federal elections in Canada the Guild first made itself heard by making a demand upon certain Liberal candidates in Montreal to support their fight for the elimination of the seniority rule in the Canadian National. One candidate who interested himself in their behalf was Herbert M. Marler, who was invited to join the Mackenzie King Cabinet at Ottawa but was defeated on polling day. At the special request of Premier King Mr. Marler was asked during the election campaign to acquaint himself with the demands of those railway war veterans.

At a meeting of the Montreal Guild held in Montreal last week a communication was read from Mr. Marler asking that arrangements be made for a further conference on their demands. At the same meeting it was announced that the Guild would do everything possible to eliminate the seniority rule on the railways, as it affects the returned men, and that when the Canadian Parliament opens next month their case will be pressed by personal representatives.

Labor Board Decisions

New Rule Covering Work Not Continuous with the Regular Tour of Service

In Decision No. 3535 dated May 13, 1925, in a case involving the Chicago & North Western and the Brotherhood of Maintenance of Way Employees with respect to the interpretation of Rule 30, the case was remanded with the direction that the employees and the carrier negotiate a new rule. However, because of failure to agree two rules were submitted to the board, one by the employees and the other by the carrier, and each side offered objections to the rule submitted by the other. The board decided this case by drafting a new rule to be incorporated and made a part of the agreement between the two parties to take the place of Rule 30 then in effect, the new rule being as follows: "Except as otherwise provided in these rules, employees notified or called to perform work not continuous with the regular work period will be allowed a minimum of three hours for two hours work or less. If held on duty in excess of two hours, time and one-half time will be allowed on the minute basis."—*Decision No.* 3978.

Coal Chute Employees Not Entitled to Time and One-Half for Sunday and Holiday Work

The Brotherhood of Maintenance of Way Employees raised an issue before the Labor Board with respect to the interpretation of Article V, Sections A-5 and A-6, as applied to coal chute employees on the Chicago & North Western. The sections of Article V referred to provide for the payment of time and one-half for work on Sundays and certain specified holidays for all employees except those necessary to the continuous operation of powerhouses, enginehouses, etc., specifically listing the positions coming under this exception. It was the contention of the brotherhood that inasmuch as the coal chute employees were not mentioned in the positions listed they were entitled to time and one-half rate for Sunday and holiday work. The decision of the board is that the employees in question are necessary to the continuous operation of the railroad and should therefore be compensated at the pro-rata rate when regularly assigned to perform Sunday and holiday service in accordance with the provisions of Sections A-5 and A-6 of Article V.—*Decision No.* 3979.

Foreign Railway News

British Unions Ambitious Wage Increase Program Fails

The British railway unions, which almost a year ago embarked upon a campaign for a general increase in wages and greatly improved working conditions, have lost their case before the National Wages Board. The decision is not, however, a complete defeat for the unions, because the railway companies were seeking decreases in wage rates at the same time from the tribunal. Earnings of the British railways have suffered severely during recent months and the award was not unexpected. One union—the enginemen's—did not join the other two, the clerks' and the National Union of Railwaymen, in the request for increases.

Miscellaneous Notes

The Bureau of Foreign and Domestic Commerce has received the following reports from its agents in various parts of the world:

The building program of the Hungarian State Railways is now under way. It will involve an expenditure of 25,500,000 gold crowns (370 billion paper crowns). Of this amount, 141 billion paper crowns are to be used for new railway cars, 20 billion for the extension of the double lines from Gyor to Negyeshalom, 8 billion for the extension of the Budapest East Railway station. The work will be distributed on the basis of public tenders and will be begun during the current year.

The railroad from Salta, Argentina, to Antofagasta, Chile, will be built, the President of Chile having been authorized to sign a convention with the government of Argentina for that purpose. This project has been pending for several years.

Transportation conditions on the Chinese railways are worse. The Blue Express passenger service on the Tientsin-Pukow Railway has been suspended. The Peking-Mukden Railway Administration has ordered all express cars to be concentrated in Tientsin. The line to Mukden is still open, but service is irregular. Freight service on the Peking-Suiyuan Railway is suspended. American cargo sent northward the first of October had not been delivered on the 19th.

The Argentine State Railways have been authorized to purchase 20 locomotives and signal equipment, subject to the approval of the Congress.

Orders for plant and machinery for the electrification of the main line Great Indian Peninsular Railway will go to England, according to the London press. This equipment will involve a sum of £5,000,000.

An underground railway is being built in Oslo (Christiania), Norway. The tunnel, which is expected to be completed within two and one-half years, will carry the trains of the four lines handling the heaviest traffic from the surrounding districts of Oslo.

The Java State Railways desire to proceed with electrification of the remaining sections of the lines and it is expected that the new Minister for the Colonies will co-operate in the materialization of this plan. It has been recommended that the line Manggarai-Buitenzorg be the next to be electrified, and that this be followed by the Buitenzorg-Soekaboemi, Soekaboemi-Padalarang and Poerwakarta-Bandoeng sections. While the characteristics of the rolling stock will vary according to the particular requirements of the sections, an effort is being made to minimize the number of types of locomotives.

Construction of 4,150-foot steel bridge over the Zambesi river has been approved. The British Government will loan £1,000,000 to finance the work. The bridge will greatly benefit the British Nyasaland Protectorate, as at present railway shipments from Nyasaland must be ferried across the river.

An extraordinary credit of 2,970,000 pesos (paper) for the Argentine State Railways has been asked by the railway administrator. The amount, which is equivalent to approximately $1,227,000, will be used for the purchase of new equipment, especially locomotives.

Equipment and Supplies

Locomotives

GULF COAST LINES.—See Missouri Pacific.

INTERNATIONAL-GREAT NORTHERN.—See Missouri Pacific.

THE VICTORIA-A-MINAS has ordered four 4-6-0 type locomotives from the Baldwin Locomotive Works.

THE ANDES COPPER MINING COMPANY has ordered one Consolidation type locomotive from the Baldwin Locomotive Works.

THE CEIBA GRAN FERROCARRIL DE LA Venezuela has ordered one Consolidation type locomotive from the Baldwin Locomotive Works.

THE BALTIMORE & OHIO has ordered 25 Santa Fe type locomotives from the Baldwin Locomotive Works. This is in addition to the 25 ordered from the Lima Locomotive Works, as was reported in the *Railway Age* of December 19.

THE MISSOURI PACIFIC has ordered 5 Pacific type and 10 Mikado type locomotives for service on the International-Great Northern and the Gulf Coast Lines, from the American Locomotive Company. The Pacific type locomotives will have 27 in. by 28 in. cylinders and a total weight in working order of 301,000 lb., and the Mikado type locomotives will have 27 in. by 32 in. cylinders and a total weight in working order of 340,000 lb. Inquiry for this equipment was reported in the *Railway Age* of December 12.

Freight Cars

THE CHICAGO, BURLINGTON & QUINCY is inquiring for 1,500 box cars.

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 400 underframes.

THE PACIFIC FRUIT EXPRESS is now inquiring for 5,041 refrigerator cars.

THE CHICAGO & NORTH WESTERN is inquiring for 450 freight car underframes.

THE NORTH AMERICAN CAR COMPANY is inquiring for 400 tank cars of 40 tons' and 8,000-gal. capacity.

THE INSPIRATION CONSOLIDATED COPPER COMPANY, New York, is inquiring for 20 air dump cars of 30-cu. yd. capacity.

THE BALTIMORE & OHIO contemplates the purchase of additional freight equipment and expects to ask for bids on 2,000 hopper cars of 70 tons' capacity.

THE PITTSBURGH & WEST VIRGINIA has ordered 300 gondola cars from the Canton Car Company in addition to the 700 ordered from the Pressed Steel Car Company.

THE CHICAGO & NORTH WESTERN is expected to enter the market for 150 ore cars in addition to the 300 convertible coal cars for which an inquiry has already been issued.

Passenger Cars

THE FLORIDA EAST COAST is inquiring for two mail cars.

THE READING COMPANY has ordered 15 baggage cars from the American Car & Foundry Co.

THE CHICAGO & ALTON has ordered Oneida power units from the Railway Motors Corporation, Chicago, for application to one of its passenger cars.

THE BROOKLYN-MANHATTAN TRANSIT will ask for bids in the near future for 201 steel subway cars (67 triplex articulated units each upon four trucks, with a motor upon each of the four trucks).

THE DELAWARE, LACKAWANNA & WESTERN has ordered 35 express cars from the American Car & Foundry Co. Inquiry for this equipment was reported in the *Railway Age* of November 21.

THE ST. LOUIS-SAN FRANCISCO has placed an order with the Railway Motors Corporation for Oneida power units for the motorizing of a passenger coach. This car will be operated in the Ozarl Mountain region of Missouri.

THE BALTIMORE & OHIO expects to ask for bids in the near future on 25 coaches, 15 combination passenger and baggage cars, 5 dining cars, 3 postal cars, 5 mail compartment cars, 15 baggage cars and 10 horse express cars.

THE ATLANTIC COAST LINE has ordered 30 express cars, 25 coaches, 10 combination passenger and baggage cars, 5 combination baggage and mail cars, and 2 postal cars from the Pullman Car & Manufacturing Corp. Inquiry for this equipment was reported in the *Railway Age* of November 28.

THE MISSOURI PACIFIC has changed its inquiry to 3 straight coaches, 3 divided coaches, 2 chair cars, 2 combination mail and chair cars, 2 mail and baggage cars, 2 coach and baggage, 2 passenger, baggage and mail cars and 2 club cars.

Iron and Steel

THE NEW YORK, CHICAGO & ST. LOUIS has ordered 7,000 tons of rails from the United States Steel Corporation and has divided an order for 10,000 tons between the Inland Steel Company and the Bethlehem Steel Company.

Machinery and Tools

THE BALTIMORE & OHIO has ordered two grinding machines from Manning, Maxwell & Moore, Inc.

THE NEW YORK CENTRAL has ordered a 20-in. lathe and a Bertsch bending roll from Manning, Maxwell & Moore, Inc.

THE ATCHISON, TOPEKA & SANTA FE has ordered a 15-ton overhead traveling electric crane, from Manning, Maxwell & Moore, Inc.

FREIGHT CARS ORDERED, INSTALLED AND RETIRED

	Domestic orders reported during month	Installed during month	Aggregate capacity tons	Retired during month	Aggregate capacity tons	Owned at end of month	Aggregate capacity tons	On order as of first of following month	Building in R. R. shops
January, 1925	10,312	11,768	551,263	7,867	326,812	2,341,109	103,812,974	58,910	5,285
February	5,388	15,024	721,867	9,453	365,111	2,346,687	104,169,525	50,603	4,878
March	4,677	16,007	753,947	12,067	474,644	2,350,697	104,454,128	45,419	5,572
April	5,525	13,749	652,462	10,497	423,322	2,353,956	104,683,798	42,602	8,072
May	8,944	12,982	612,607	8,658	335,401	2,356,641	104,902,235	35,823	9,042
June	777	12,191	590,657	9,797	365,589	2,359,040	105,127,861	27,458	8,633
July	843	10,542	504,185	10,051	384,084	2,361,551	105,350,472	26,087	8,189
August	2,816	11,554	564,681	9,259	364,487	2,363,849	105,550,765	20,151	6,440
September	6,113	8,161	361,755	9,196	342,756	2,363,637	105,600,432	19,548	6,246
October	5,556	5,097	227,807	9,616	373,093	2,359,124	105,460,801	23,333	7,189
November	13,598	.....	.....	.....	.....	.....	.....	.....	.....
Total for 10 months	.....	117,075	.....	.....	.....	.....	.....	.....	.....
Total for 11 months	64,549	.....	.....	.....	.....	.....	.....	.....	.....

[s]Corrected figure.

[1]Details as to orders from *Railway Age* weekly reports. Figures include all domestic orders placed with builders and railroad shops but not rebuilt equipment.

[2]Figures as to installations and retirements prepared by Car Service Division A. R. A. Figures cover only those roads reporting to the Car Service Division. They include equipment received from builders and railroad shops. Figures of installations and retirements alike include also equipment rebuilt to an extent sufficiently so that under the accounting rules it must be retired and entered in the equipment statement as new equipment. The figures as to orders as given in the first column of table are not comparable with figures relating to installations given in succeeding columns.

Supply Trade News

The Charles F. Elmes Engineering Works, Chicago, has opened an office at 30 Church street, New York, in charge of **Charles M. Gray.**

E. C. Chacey has been appointed sales representative in charge of the New York office of the **American Creosoting Company,** Louisville, Ky.

The United States Gypsum Company, Chicago, has acquired 75 acres of land at North Canaan, Conn., upon which it plans the construction of a plant.

The Railway Motors Corporation, De Pere, Wis., has succeeded to the railway department of the **Oneida Manufacturing Company,** Green Bay, Wis.

The Independent Pneumatic Tool Company, Chicago, has opened a branch sales office and service station at 1103 Genesee building, Buffalo, N. Y., and has appointed **Joseph P. Fletcher** manager.

The H. D. Foote Lumber Company, Alexandria, La., has opened a branch office in St. Louis, Mo., at 1722 Railway Exchange building, in charge of **Joe K. Wesson,** formerly general sales manager for the Central Coal & Coke Company, Kansas City, Mo.

Graybar Electric Company Takes Over Western Electric Supply Business

The electrical supply business carried on by the Western Electric Company has been set apart from the telephone manufacturing business and incorporated under the name of GRAYBAR ELECTRIC COMPANY. This gives to the supply department a separate identity which is made necessary by its importance as the largest merchandiser of electrical apparatus and related equipment in the world. Since it came into existence in 1869 as the partnership of Gray & Barton, the name which it now resumes in modified form, the supply business has grown steadily until it now has 55 distributing houses in important cities. The WESTERN ELECTRIC COMPANY has been both the manufacturing company of the Bell System and a distributor of electrical supplies. Both of these lines of business require specialized organization and specialized management. The rapid expansion of the supply department made an entirely separate corporate identity even more necessary.

Physical separation of the two departments of the Western Electric Company was carried out in 1923 with the opening of general offices for the Supply Department in the Pershing Square Building, New York. The advent of the Graybar Electric Company into this field as the successor to the Western Electric Company therefore involves comparatively few changes.

This is one of the very few instances in business history, if not the only one, where a corporation has reverted to its original designation as a basis for its corporate name after such a lapse of time and a period of such tremendous growth. The new name is particularly appropriate since the company is carrying on a business continuing that of the original partnership as it would have developed without the changes caused by the invention of the telephone and the advent of the manufacture of the telephone.

The Graybar Electric Company has distributing houses in Albany, Atlanta, Baltimore, Birmingham, Boston, Brooklyn, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Davenport, Denver, Detroit, Duluth, Grand Rapids, Harrisburg, Houston, Indianapolis, Jacksonville Kansas City, Los Angeles, Memphis, Miami, Milwaukee, Minneapolis, Nashville, Newark, New Haven, New Orleans, New York, Norfolk, Oakland, Omaha, Philadelphia, Pittsburgh, Portland, Providence, Richmond, Salt Lake City, San Antonio, San Francisco, Savannah, St. Paul, St. Louis, Seattle, Spokane, Syracuse, Tacoma, Tampa, Toledo, Worcester and Youngstown. Sales of the Supply Department of the Western Electric Company amounted to $50,000,000 in 1923 and $66,000,000 in 1924.

In 1869, Enos M. Barton, a telegraph operator, obtained four hundred dollars by mortgaging his mother's home to help buy an interest in an electrical shop managed by George Shawk in Cleveland. Electricity was too much of a speculation for Shawk and the ups and downs of business worried him so that in the same year he retired in favor of the partnership of Gray & Barton. Elisha Gray's inventions became one of the chief assets of Gray & Barton. The company reorganized in 1872 and became the Western Electric Manufacturing Company, one-third of the stock being sold to the Western Union Telegraph Company, an arrangement which brought more business and more equipment. In

A. L. Salt

F. A. Ketcham

G. E. Cullinan

J. N. Walker has been appointed general sales manager of the **Oxweld Acetylene Company,** New York; **L. D. Burnett** has been appointed eastern department sales manager, to succeed Mr. Walker, and **Z. T. Davis, Jr.,** is now assistant sales manager, eastern department.

The Charles R. Long, Jr., Company, Louisville, Ky., has purchased a tract of land at Sixteenth and Hill streets, upon which it will construct a new plant and lacquer plant, to cost $450,000. The construction will be started immediately, the first unit to be four stories with basement, 70 ft. by 120 ft., and of reinforced concrete.

T. D. Owler has been appointed Chicago railway sales representative of the **Heywood-Wakefield Company,** Wakefield, Mass. Mr. Owler has served for some time with Edward Buker, whom he succeeds as Chicago railway sales representative, Mr. Buker having resigned to go into business on his own account, effective January 1.

The Russell-Burdsall-Ward Bolt & Nut Corporation, Rochester, N. Y., has awarded a contract for the design and construction of a wire mill at its Rock Falls, Ill., plant, to the Austin Company, Cleveland, Ohio. The new mill will be a one-story steel frame building, 85 by 160 ft., and will contain approximately 80 tons of structural steel.

1877 the Western Electric Manufacturing Company made its first telephone instruments. The Western Electric Company succeeded the old company in 1881, and became the following year the manufacturing headquarters for the Bell Telephone System. Notwithstanding the importance of the telephone department, however, there was no relaxing of enterprise in the field of electrical supplies. The year-book of the Graybar Electric Company with more than a thousand pages in 1926 compares with a twenty-page catalog of three decades ago which consisted chiefly of remarks about bells and buzzers.

The Graybar Electric Company will continue the sale of all devices and materials which constituted its business under the Western Electric name. Apparatus such as motors, generators, electric lamps, industrial and other lighting equipment, household appliances, and the like, formerly sold under the Western Electric name, will now be sold under the trade name of Graybar. The company will continue to market equipment of Western Electric manufacture, such as telephone train despatching apparatus, intercommunicating telephone systems, lead-covered cable, etc. It will be concerned with radio through its sale of broadcasting apparatus and other radio telephone equipment which the Western Electric Company may manufacture. Other supplies entering into the Graybar business will be pole line equipment, schedule material, wire, accessories for electrical contractors and dealers, carrier current systems, etc.

The Graybar Electric Company thus perpetuates the memory of Elisha Gray and Enos M. Barton, both of whom contributed a great deal to the advancement of the industry. Mr. Barton continued as president of the Western Electric Company until 1908, and he was chairman of the board until his death in 1916. Professor Gray was the forerunner of the engineering department which played a vital part in the history of the company and the application of electricity.

ALBERT LINCOLN SALT, president of the new Graybar Electric Company, began his business career in 1881 as a temporary office boy in the New York office of the Western Electric Manufacturing Company. Mr. Salt had finished grammar school, and his connection with business was supposed to last only through the summer after which he was to go to school again. Instead he was promoted within a fortnight to mail clerk, and when the time for school came his parents were prevailed upon to let him work days and study nights. This he did until he reached the age of 25. He advanced to the positions of assistant bookkeeper and cashier, and in 1886 was made shipping ticket clerk and later placed in charge of billing. In 1892 he was placed in charge of the retail sales and general clerical work. During the period of 1895-1899 he was assistant manager of the New York office in charge of telephone sales and purchases, and in 1900 succeeded to the dual position of assistant telephone sales manager and general purchasing agent. Mr. Salt was placed in charge of the traffic arrangements for the telephone companies in 1898. In 1913 he was elected vice-president of the Western Electric Company in charge of purchases and Traffic. He has been a director of the Western Electric Company since 1915. He is also president of the Manufacturers' Junction Railway Company of Chicago.

FRANK A. KETCHAM has been appointed executive vice-president of the new company. He was born at Saginaw, Michigan, and attended the University of Michigan. He started his business career with the Western Electric Company at Chicago in 1900 and five years later held the rank of telephone storekeeper. He was advanced to the assistant managership in 1907, and in 1911 was appointed manager. A short time after, he was promoted to the title and duties of central district manager. Mr. Ketcham became general sales manager of the Western Electric Company in 1918, and in 1923 was appointed general manager of the Supply Department which had been separated from the Telephone Department in 1921.

GEORGE E. CULLINAN, vice-president in charge of sales entered the statistical department of the Western Electric Company immediately after his graduation from Williams College in 1901. In 1907 he was transferred to St. Louis. He became assistant manager at St. Louis the following year and in 1909 was promoted to the position of manager. Later he became Western district manager with headquarters in St. Louis, and this was followed by a transfer to Chicago as manager of the Chicago distributing house and Central district manager. In January, 1923, he came to New York as general sales manager of the Western Electric Supply Department.

LEO M. DUNN has been appointed vice-president in charge of merchandising and accounting. Mr. Dunn went to work at the age of 11 in March, 1886, as an office boy with the Central District Printing & Telegraph Company of Pittsburgh, an operating telephone concern associated with the Western Electric Company. In 1910 he was chief storekeeper of the Pittsburgh distributing house of the Western Electric Company. He became manager at Pittsburgh in 1913, and manager of the Philadelphia house in 1918; the next year he was made assistant Eastern District manager. Two years later he was transferred to New York as manager of the New York distributing house and Eastern district manager. He became general merchandise manager of the Supply Department in 1923.

L. M. Dunn

E. W. Shepard

N. R. Frame

ELMER W. SHEPARD, who has been appointed treasurer has held the position of general credit manager of the Western Electric Company since 1918. Mr. Shepard was born in Winona, Minnesota. His first job was that of office boy for the Chicago Great Western Railroad. He was employed in the auditing department of the Western Electric Company at Chicago in 1906 where he remained until 1908 when a transfer and a promotion made him cashier and credit man at the Indianapolis office. He returned to Chicago in 1911 in the credit department, and two years later was advanced to the rank of credit manager at Cleveland. In 1918 came his appointment as general credit manager of the company.

N. R. FRAME, who has been appointed secretary of the company, began his business career as an office boy for the firm of Hard & Rand, coffee merchants of New York. Subsequently he worked for a real estate concern, and then determined to study law. He is a graduate of the Horace Mann School, and took special work at Columbia and Teachers College in economics and preliminary legal work. He began the study of law with a year at Albany Law School, and his course was completed by two years at New York Law School. He entered the offices of Barber, Watson &

Gibboney as clerk and later became managing clerk. He was associated with F. Campbell Jeffery in the practice of law, first as assistant, and later as partner. In May, 1923, Mr. Frame joined the Western Electric Company as attorney in the legal department, a position from which he is advanced to the secretaryship of the new company.

The capitalization of the Graybar Electric Company is $15,000,000, all of the stock being owned by the Western Electric Company. The directors of the new company include the president, the three vice-presidents; Charles G. Du Bois, chairman, and the following executives of the Western Electric Company: Richard H. Gregory, comptroller; Howard A. Halligan, vice-president; George C. Pratt, general attorney, and William P. Sidley, general counsel.

Obituary

James R. Reniff, of the Vapor Car Heating Company, Inc., Chicago, who died on December 20, at Wenatchee, Wash., was born in Greenfield, Mass., on February 9, 1843. He entered railway service with the Illinois Central in the car shops and later was employed by the Chicago & Alton at Bloomington. He enlisted in the Union Army in 1861 and was in the siege of Vicksburg and Sherman's march to the sea. After the Civil War he re-entered the employ of the Chicago & Alton and was successively employed by the Chicago, St. Paul, Minneapolis & Omaha, as master carbuilder in 1881, the Union Pacific, the Canadian Pacific as general division foreman in 1884, the Pullman Company, the Pere Marquette, the Atchison, Topeka & Santa Fe and the New York Central as division master carbuilder in 1892. Since 1905 he has been on the staff of the president of the Vapor Car Heating Company.

November Locomotive Shipments

The Department of Commerce reports the following shipments of railroad locomotives, from the principal manufacturing plants, based on reports received from the individual establishments:

Year and month	Shipments			Unfilled orders end of month		
	Total	Domestic	Foreign	Total	Domestic	Foreign
1924						
January	151	147	4	376	344	32
February	99	92	7	499	466	33
March	132	128	4	534	494	40
April	73	63	10	640	586	54
May	111	93	18	643	589	54
June	145	134	11	531	462	69
July	140	130	10	483	416	67
August	139	121	18	361	306	55
September	104	79	25	386	333	53
October	96	78	18	462	398	64
November	133	123	10	397	331	66
Total (11 mos.)	1,323	1,188	135	....	....	....
1925						
January	90	45	45	407	351	56
February	85	73	12	397	343	54
March	109	93	16	447	351	96
April	92	82	10	477	362	115
May	96	68	28	467	353	114
June	110	61	49	397	300	97
July	66	58	8	378	283	95
August	104	91	13	309	225	84
September	94	50	44	363	296	67
October	79	54	25	497	397	100
November	98	52	46	548	448	100
Total (11 mos.)	1,023	727	296	....	....	....

Trade Publications

PATENTS.—The third edition of "Patents, Law and Practice" has been issued by Richards & Geier, patent and trade-mark attorneys, 277 Broadway, New York, and is available to manufacturers and those generally interested in the subject of inventions and their proper and adequate protection. Both United States and foreign patents are covered, information being given as to who may obtain patents, what may be patented, how to apply for a patent, the procedure followed in the patent office, interferences, reissues, appeals, infringements, etc. The charges for various services in connection with the preparation of the patent are given in schedule form.

Railway Construction

ATLANTIC COAST LINE.—The Interstate Commerce Commission has authorized the construction of an extension from Perry, Fla., to Monticello, 41 miles; estimated cost $1,424,000.

ATCHISON, TOPEKA & SANTA FE.—A contract has been awarded to Jerome A. Moss, Chicago, Ill., for the construction of a 37-ft. by 300-ft. office building in connection with the fruit terminal at Chicago, to cost $100,000.

BALTIMORE & OHIO.—Plans for the construction of a coaling station at Mitchell, Ind., are being revised and new bids will soon be taken. Bids previously received conforming to the old plans have been returned.

ILLINOIS CENTRAL.—The construction of a water station and related facilities at Xenia, Ill., on this company's Edgewood cut-off between Edgewood, Ill., and Metropolis, has been authorized. A contract for the construction of a reservoir and pipe line, to cost approximately $70,000, has been awarded to the Railroad Water & Coal Handling Company, Chicago. Bids are being received for the construction of the water station.

NATIONAL RAILWAYS OF MEXICO.—Plans are reported to have been prepared for the construction of steel oil storage tanks with locations and capacities as follows: a 1,000,000-bbl. tank at San Luis Potosi; 500,000-bbl. tanks at Mexico City, Aguascalientes, Irapuato, Torreon and Monterey; 55,000-bbl. tanks at Mendez, San Luis Potosi and eight other points.

NEW YORK CENTRAL.—Plans have been prepared for the construction of a one-story locomotive testing shop at Elkhart, Ind., to cost $65,000.

SOUTHERN.—Three large new bridges are to be built by this company on its line between Rome, Ga., and York, Ala., and five other bridge improvement projects are to be carried out immediately at points on the Mobile, Birmingham and Memphis divisions. Near Nottingham a new bridge, 162 ft. long, consisting of two 81-ft. deck plate girder spans and a new concrete center pier will replace the present bridge spanning Talladega river. At Tallassa Hatchie, near Childersburg, a new bridge 215 ft. 4 in. long is to be built to consist of two 81-ft. and two 26-ft. 8-in. deck girders on new concrete masonry. A new bridge 404 ft. long will be built across Mulberry creek near Fremont to replace the present bridge and trestle. The new bridge will consist of two 147-ft. through truss spans and two 55-ft. deck girder spans, all to be erected on new concrete piers. A new concrete pier is to be built at the Cahaba river bridge near Harrell. On the line between Marion Junction and Mobile two new bridges over little Chillahatchie, near Alberta, are to be built, one to consist of two deck plate girder spans 37 ft. and 32 ft. 2 in. long, and the other of one 40-ft. 7-in. deck girder span. On the Birmingham-Atlanta line a new bridge is to be built across the Tallapoosa river consisting of two 50-ft. deck girder spans and a new concrete center pier. On the Chattanooga-Memphis line, near Iuka, Miss., the bridge spanning Clear creek will be improved by remodeling the present masonry and installing a new deck girder span.

SOUTHERN ILLINOIS & KENTUCKY.—The Interstate Commerce Commission has extended to December 31, 1927, the time for the completion of this company's line from Metropolis, Ill., south into Kentucky under the certificate issued by the commission.

UNION PACIFIC.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a line of 10 miles southerly from a point near Yoder, Wyo.

A CONTRACT FOR THE CONSTRUCTION of a broad-gage railway from the mouth of the Rio Grande to Guadaloupe has been granted by the government of Nicaragua to Angel Caligaris. The contract also provides for dredging the Rio Grande as far as Guadaloupe, dredging the bar at the mouth of the river, and constructing a pier.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $1,300,000 general mortgage 4 per cent bonds to be delivered to the Healdton & Santa Fe for the purchase of the property of the Oklahoma, New Mexico & Pacific and the Ringling & Oil Fields.

CHESAPEAKE & OHIO.—*Acquisition and Operation of Branches.*—This company has been authorized by the Interstate Commerce Commission to acquire the Stephens Branch from Dinwood, Floyd County, Ky., 1.75 miles, and the Jones Fork Branch near Lackey in the same county, 1.76 miles. The properties will be acquired from the coal companies by whom they were built.

CHICAGO, ROCK ISLAND & PACIFIC.—*Abandonment.*—The Interstate Commerce Commission has authorized the abandonment of the line from Preemption to Cable, Ill., 5.2 miles.

GREAT NORTHERN.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $5,000,000 general mortgage 5 per cent bonds to retire outstanding bonds.

KENTWOOD, GREENSBURG & SOUTHWESTERN.—*Final Value.*—The Interstate Commerce Commission has found the final value for rate-making purposes of the property owned and used for common-carrier purposes to be $134,423 as of June 30, 1916.

NEW YORK, CHICAGO & ST. LOUIS.—*Brief Opposing Unification Plan.*—H. W. Anderson and other counsel for the Scott committee representing minority stockholders of the Chesapeake & Ohio have filed with the Interstate Commerce Commission their brief opposing the Van Sweringen unification plan. In conclusion the brief says:

"This record discloses a case in which a clear effort has been made to evade the law, and to thus accomplish an illegal thing by proceedings in themselves illegal; in which the controlling officers and a majority of the directors of three of these great transportation corporations have violated their trusts, and sought to so use the powers which are vested in them for the benefit of the public and all of the stockholders so as to advance and promote their own private interests and to oppress the minority; in which the terms proposed are unjust and unreasonable as to the public and grossly unjust and unreasonable as to the stockholders of at least the Chesapeake and Hocking companies; in which no real or substantial transportation benefits or economies have been or can be shown, while an immediate increase in dividend charges against the public of $6,700,000 per annum is contemplated; in which every principle or plan of consolidation ever suggested or promulgated by this commission is violated; and from which a serious disruption of existing lines of traffic with industrial confusion and increased cost to the public would inevitably result.

"It is a plan conceived by promoters and bankers in the interest of promoters and bankers for the definite purpose, through the manipulation and exchange of securities and taking from stockholders their voting rights, to vest in themselves complete control of five great transportation systems and to enable these promoters and bankers to realize for themselves immediate profits running into many millions of dollars at the expense of the transportation services of the country.

"This was not the intent or purpose of the transportation act; it is not just to the stockholders of these companies; it is not in the interest of the public; it cannot fail, if approved, to react to the serious prejudice of the railroads of the country and to discredit the whole policy of railroad consolidation."

OHIO & KENTUCKY.—*Suit for Receiver.*—Suit was filed in the United States District Court at Covington, Ky., on December 2 for the appointment of a receiver for this company which operates 40 miles of line between Cannel City, Ky., and the Licking River.

PRESCOTT & NORTHWESTERN.—*Final Value.*—The Interstate Commerce Commission has found the final value for rate-making purposes of the property owned and used for common-carrier purposes to be $350,120 as of June 30, 1916.

RICHMOND, FREDERICKSBURG & POTOMAC.—*Extra Dividend.*—Directors have declared an extra dividend of $5 in addition to the regular annual dividend of $7. In 1924, the company declared only the regular dividend of $7. This dividend applies on the $1,316,900 voting common stock, $481,000 guarantee 7 per cent stock, $19,300 guaranteed 6 per cent stock, and $9,017,500 non-voting dividend obligations, but it does not apply on the $4,000,000 6 per cent non-voting common stock. The company is controlled by the Pennsylvania, the Baltimore & Ohio, the Southern Railway, the Atlantic Coast Line, the Seaboard Air Line and the Chesapeake & Ohio through the Richmond-Washington Company which owns $947,200 of the voting common stock.

ROCK PORT LANGDON & NORTHERN.—*Final Value.*—The Interstate Commerce Commission has found the final value for rate-making purposes of the property owned and used for common-carrier purposes to be $53,901, as of June 30, 1918.

SHELBY COUNTY.—*Final Value.*—The Interstate Commerce Commission has found the final value for rate-making purposes of the property owned and used for common-carrier purposes to be $135,253, as of June 30, 1918.

SHELBY NORTHWESTERN.—*Final Value.*—The Interstate Commerce Commission has found the final value for rate-making purposes of the property owned and used for common-carrier purposes to be $195,000 as of June 30, 1918.

SOUTHERN ILLINOIS & MISSOURI BRIDGE COMAPNY.—*Final Value.*—The Interstate Commerce Commission has found the final value for rate-making purposes of the property owned and used for common-carrier purposes to be $3,182,660, as of June 30, 1915.

SEABOARD AIR LINE.—*Equipment Trust.*—The Interstate Commerce Commission has authorized the issuance of $2,820,000 4½ per cent equipment trust certificates to be sold to Freeman & Co. at 96.51 and accrued dividends, and $313,970 non-interest deferred equipment trust certificates, series Y, to be purchased by the Seaboard Air Line itself at par. The two classes of certificates total $3,133,970, which is the approximate cost of the equipment to be purchased. This equipment includes 50 locomotives, 30 caboose cars and 16 passenger train cars.

TAMPA & GULF COAST.—*Tentative Valuation.*—The Interstate Commerce Commission has issued a tentative valuation report placing the final value for rate-making purposes of the property owned and used at $1,016,825 as of June 30, 1918.

TEXAS & PACIFIC.—*Dividend.*—Directors of the Texas & Pacific Company have declared an annual dividend of 5 per cent on the company's preferred stock, payable December 31 to stockholders of record on that date. In 1924 the company paid an initial dividend on this stock, nearly all of which is owned by the Missouri Pacific, at the rate of 5 per cent from date of issue, May 26, to December 31.

TEXAS PANHANDLE & GULF.—*Securities.*—A Texas and a New Mexico company of the same name have applied to the Interstate Commerce Commission for authority to nominally issue securities to finance the construction of a proposed line from Fort Worth, Tex., to Tucumcari, N. M.; preferred stock to the amount of $2,300,000 of the Texas company and $700,000 of the New Mexico company; common stock to the amount of $400,000 of the Texas company and $70,000 of the New Mexico company, and $9,000,000 of 5 per cent bonds.

WAYCROSS & WESTERN.—*Abandonment.*—The Interstate Commerce Commission has issued a certificate authorizing this company to abandon its line from Waycross, Ga., to Cogdell, 21 miles. This railroad originally extended from Waycross to Milltown, 44.5 miles and was completed in 1915. It was built to transport timber products but had never been profitable. The railroad was sold in a receiver's sale in 1919 at which time that part from Milltown to Cogdell, 23.5 miles, was taken up and the purchaser obtained a new charter in an attempt to continue the remaining part of the line in operation. It was shown in the testimony that on June 21, 1925, all of the company's rolling stock, office furniture, etc., was sold for taxes, necessitating the rental of equipment in order to operate.

Chicago, Milwaukee & St. Paul

Investigation Adjourned

The hearing before Commissioner Cox of the Interstate Commerce Commission in the investigation of the receivership of the Chicago, Milwaukee & St. Paul, which opened at the Great Northern Hotel, Chicago, on December 15, was adjourned on December 18, at which time it was decided that the date and place of future hearings would be announced later. H. E. Byram, receiver, occupied the stand on the last three days of the hearing. He was cross-examined for two and one-half days upon the testimony he presented at the hearing in Washington. In his cross-examination Mr. Byram stated that the effect of the Panama canal on the middle west could not be foreseen at the time the extension was built to Puget Sound. The St. Paul's extension, he said, was justified, for if the road was to be taken up the people of the Northwest would now object. He termed the financing of the project a legitimate transaction, saying that all stock issued was paid for.

He was also questioned upon the leasing of the Chicago, Terre Haute & Southeastern, particularly concerning the hauling of coal for company use and the division of operating costs between the railroads. Similar questions were asked concerning the Chicago, Milwaukee & Gary. The reason for purchasing the Chicago, Terre Haute & Southeastern was stated to be to protect the St. Paul in its coal requirements. The purchase of the Terre Haute, Mr. Byram said, had resulted in a saving in the cost of coal and in additional revenue from through freight traffic.

Herman L. Ekern, attorney-general for Wisconsin, in his cross-examination of Mr. Byram, endeavored to show that Kuhn-Loeb & Co., and the National City Company, were responsible for the receivership. Mr. Byram stated that the receivership was caused by the failure of the population to increase and that after the railroad had found a receivership was inevitable, the banking institutions advised that this action be taken.

Mr. Ekern questioned Mr. Byram as to whether any effort had been made to increase rates to avoid a receivership, and was told that the St. Paul had supported the two applications pending before the commission in which western carriers had asked for increases in freight rates. Questions were then directed toward the policy of asking for rate increases and attention was drawn to the fact that western carriers were asking for a general increase in rates, while at the same time they had petitioned for fourth section relief. After explaining the policy of asking for rate increases and reductions Mr. Byram stated that it seemed strange that shippers who were always anxious to have rates reduced should be so opposed to the reduction in question. Mr. Byram was also cross-examined upon statements made at the Edgewater Beach hotel, Chicago, at the hearing on the application of western carriers for a 5 per cent increase in freight rates.

Dividends Declared

Akron, Canton & Youngstown—4 per cent, payable January 1 to holders of record, December 15.

Albany & Susquehanna—4½ per cent, payable January 1 to holders of record, December 15.

Elmira & Williamsport—Preferred, $1.61, payable January 1 to holders of record, December 20.

Joliet & Chicago—1¾ per cent quarterly, payable January 4 to holders of record, December 24.

Kansas City Southern—Preferred, 1 per cent, quarterly, payable January 15 to holders of record, December 31.

Northern Securities—4 per cent, extra, 2 per cent, both payable January 11 to holders of record, December 25.

Reading Company—Common, $1, quarterly, payable February 11, to holders of record January 14. Second preferred, 50c., quarterly, payable January 14 to holders of record, December 28.

Sussex R. R.—1 per cent, payable January 2 to holders of record, December 26.

Texas & Pacific—Preferred, 5 per cent, annually, payable December 31 to holders of record of December 31.

Western Pacific R. R. Corporation—Preferred, 1½ per cent, quarterly, payable January 7 to holders of record, December 28.

Trend of Railway Stock and Bond Prices

	Dec. 22	Last Week	Last Year
Average price of 20 representative railway stocks	97.11	98.13	80.33
Average price of 20 representative railway bonds	94.15	94.91	89.06

Railway Officers

Financial, Legal and Accounting

J. S. Conover has been appointed auditor of revenue of the New York Central, with headquarters at New York, succeeding **J. F. Fairlamb,** who has retired as auditor of revenue after 41 years of service, and has been appointed special assistant to the general auditor, with duties to be assigned.

Charles F. Taliaferro has been appointed general claim agent of the Atlanta, Birmingham & Atlantic, with headquarters at Atlanta, Ga., succeeding Mr. Colson, deceased. He was born in Columbus, Ga., on January 29, 1889, and began his railroad career with the Southern as stenographer at Atlanta, Ga., in 1907. He entered the service of the Atlanta, Birmingham & Atlantic on January 1, 1910, as secretary to the general claim agent, with headquarters at Atlanta, Ga. In September, 1912, he was promoted to claim agent of the Brunswick division, and remained in that position until 1917 when he entered the army during the World War. He served with both the Eighty-Second and the First divisions for two years. He entered the army as a private and rose to the rank of a lieutenant. In May, 1919, he was honorably discharged from the army and re-entered the service of the Atlanta, Birmingham & Atlantic, as claim agent of the Birmingham division, which position he was holding at the time of his recent promotion.

Emmett E. McInnis, who has been promoted to general solicitor of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, was born in 1882 at Monticello, Miss. He graduated from Austin College at Sherman, Tex., in 1901, and from the University of Texas, Austin, Tex., in 1904. Mr. McInnis engaged in the general practice of law after his graduation from college, and entered railway service in January, 1921, as attorney of the Atchison, Topeka & Santa Fe, at Oklahoma City, Okla. He was later promoted to become one of the solicitors for Oklahoma with J. R. Cottingham, under the firm name of Cottingham & McInnis, and with headquarters at Oklahoma City. Mr. McInnis continued in that capacity until his recent promotion to general solicitor, with headquarters at Chicago. The promotion will become effective January 1, 1926.

E. E. McInnis

Operating

Captain C. E. McLaren has been appointed manager of the Lake Michigan Car Ferries of the Grand Trunk, with headquarters at Milwaukee, Wis.

A. E. Vause has been appointed assistant trainmaster of the Seaboard Air Line, with headquarters at Tampa, Fla., and **H. M. Turner** has also been appointed assistant trainmaster, with the same headquarters.

A. L. Bergfeld has been appointed superintendent of transportation of the Great Northern, with headquarters at St. Paul, Minn., a newly created position. **J. B. Smith,** assistant general superintendent of transportation, with headquarters at Seattle, Wash., has been appointed assistant superintendent of trans-

portation, with headquarters at St. Paul. **J. P. Sullivan** has been appointed assistant superintendent of transportation, with headquarters at Seattle, Wash.

Lloyd Crocker, who has been appointed superintendent of the Atlantic Coast Line, with headquarters at Wilmington, N. C., was born on September 22, 1883, at Seaboard, N. C., and was educated in the Seaboard Institute. He entered railway service on May 5, 1902, as a flagman on the Atlantic Coast Line, and on January 20, 1904, became a conductor. He became acting trainmaster on April 25, 1924, and trainmaster on November 1, 1925, which position he was holding at the time of his recent appointment to superintendent.

C. E. Brinser, who has been promoted to superintendent of the Elmira division of the Pennsylvania, with headquarters at Elmira, N. Y., was born on December 3, 1881, at Elizabethtown, Pa. He entered railway service in April, 1900, as a rodman on the Pennsylvania, subsequently being promoted to supervisor of track, division engineer, assistant superintendent and engineer maintenance of way. Mr. Brinser was promoted to superintendent of the Louisville division in April, 1923, and when that division was absorbed by the Indianapolis division in May, 1925, was appointed assistant superintendent of the newly created Indianapolis division. He continued in that capacity until his recent promotion to superintendent of the Elmira division.

Traffic

Roy A. Bishop, who has been promoted to general passenger agent of the Chicago Great Western, with headquarters at Chicago, was born on May 7, 1883, at Cleveland, Ohio, and entered railway service in April, 1901, in the traffic department of the Great Northern at Minneapolis, Minn. He was promoted to contracting freight agent in 1905, and held that position until 1908, when he was appointed agent of the Chicago Great Western at Winona, Minn. Mr. Bishop was promoted to general agent, with headquarters at Duluth, Minn., in 1912, leaving railway service in 1918 to engage in the commission business. He was appointed traveling freight agent of the Chicago Great Western in March, 1920, holding that position until August of the same year, when he was promoted to general agent, freight department, with headquarters at St. Paul, Minn. He was later promoted to division freight and passenger agent of the Northern division, with headquarters at Red Wing, Minn., and continued in that capacity until his recent promotion to general passenger agent.

Roy A. Bishop

O. P. Bartlett has been appointed assistant to the director of traffic of the Southern Pacific, lines in Texas and Louisiana. He will have charge of passenger matters including solicitation under the direction of the director of traffic.

E. E. Grimes, division freight agent of the Chicago, Burlington & Quincy, with headquarters at Lincoln, Neb., has been promoted to general live-stock agent, on the lines west of the Missouri river, with the same headquarters, succeeding **John Petrie,** deceased.

L. A. Behrle, chief of the tariff bureau of the Chicago & Alton, with headquarters at Chicago, has been promoted to assistant general freight agent, with the same headquarters, a newly created position. **F. P. O'Reilly** has been appointed chief of the tariff bureau in place of Mr. Behrle.

F. B. Choate, assistant general freight agent of the Union Pacific, with headquarters at Omaha, Neb., has been promoted to general freight agent, with the same headquarters, effective January 1, succeeding **W. H. Garratt,** who is retiring after 53 years of railway service, of which 38 years have been with Union Pacific.

Effective January 1, 1926, a freight traffic agency of the **Mobile & Ohio** will be established at Minneapolis, Minn., with headquarters in the Metropolitan Life Building. **A. A. Thorberson,** commercial agent, will be in charge of the agency. **B. T. Smith** has been appointed commercial agent, with headquarters in New York City.

Mechanical

W. L. Leighton has been appointed supervisor of passenger locomotive operations on the Seaboard Air Line, with headquarters at Tampa, Fla. **J. C. Trigg** has been appointed road foreman of engines, with the same headquarters.

Engineering, Maintenance of Way and Signaling

A. A. Johnson, supervisor of track of the New York Central at West Albany, N. Y., has resigned to become track engineer of the Delaware, Lackawanna & Western, with headquarters at Hoboken, N. J., succeeding C. E. Gosline, deceased.

Special

H. W. Hudgens, chief claim agent of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., has been appointed director of the newly created accident prevention department.

Obituary

Charles H. Hubbell, formerly superintendent of the Amarillo division of the Chicago, Rock Island & Pacific, who retired in 1922, died at Amarillo, Tex., on December 17.

G. W. Atmore, senior assistant superintendent of the Northern Pacific at Duluth, Minn., and general superintendent of the union passenger terminal there, died in that city on December 20.

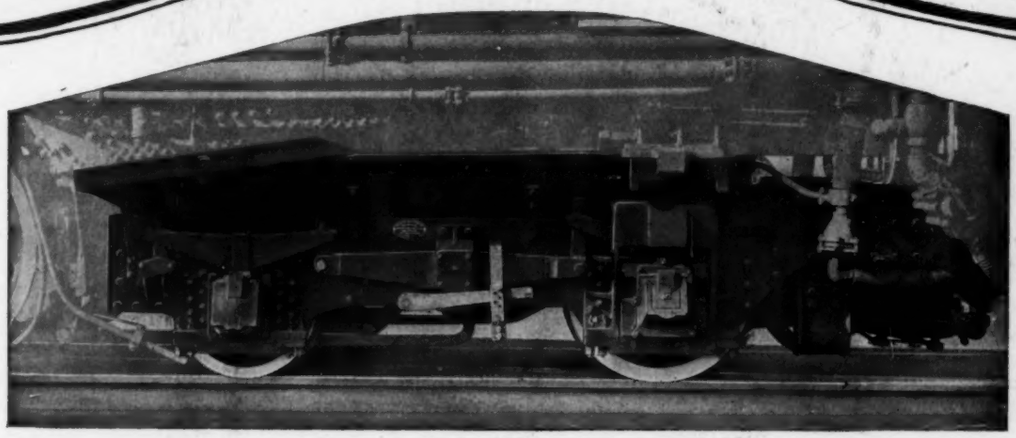
H. C. Clevenger, coal traffic manager of the Pennsylvania at Pittsburgh, Pa., died on December 17 of heart disease in his office at Pittsburgh. A sketch of Mr. Clevenger's railway career appeared in the *Railway Age* of November 14, 1925, at which time he was promoted to coal traffic manager.

Frank A. Merrill, chief engineer of the Boston & Maine, died at his home in Lynn, Mass., on December 21, after a long illness. He was born on September 1, 1857, and graduated from the Chandler Scientific Department of Dartmouth College in 1878. He entered railway service in 1874 as a rodman on the Boston, Concord & Montreal and Concord (now Boston & Maine), and until 1895, he was chief engineer on the Concord & Montreal (now Boston & Maine). At that time he became assistant chief engineer on the Boston & Maine. He later became engineer maintenance of way, which position he held until the later part of 1924, when he became chief engineer.

Henry W. Colson, general claim agent of the Atlanta, Birmingham & Atlantic, died at his home in Atlanta, Ga., on December 17. Mr. Colson began his railroad career as a clerk in the general offices of the Central of Georgia at Savannah, Ga. On leaving this road he entered the service of the Southern as law agent at Columbia, S. C., which position he held until he was promoted to assistant chief law agent. On September 1, 1912, he was appointed general claim agent of the Atlanta, Birmingham & Atlantic, which position he was holding at the time of his death. Mr. Colson was a member of the Southeastern Association of Railway Claim Agents and served one term as president of that association.

Railway Age

SECOND HALF OF 1925. No. 26 NEW YORK- DECEMBER 26, 1925—CHICAGO SEVENTIETH YEAR



TRAFFIC AND TRAILERS

"Somebody pays for the carrying cost of freight in transit before it reaches a market. It is secured by bank loans somewhere and the interest runs into hundreds of millions of dollars. Even a 20 per cent. saving in time between producer and consumer means something in everybody's pocket."

High sustained draw-bar pull at higher speeds saves the time this writer mentions. Capacity for making steam has been the limiting factor. This limit has been removed by The Locomotive Four-Wheel Articulated Back End and the big grate and firebox it carries.

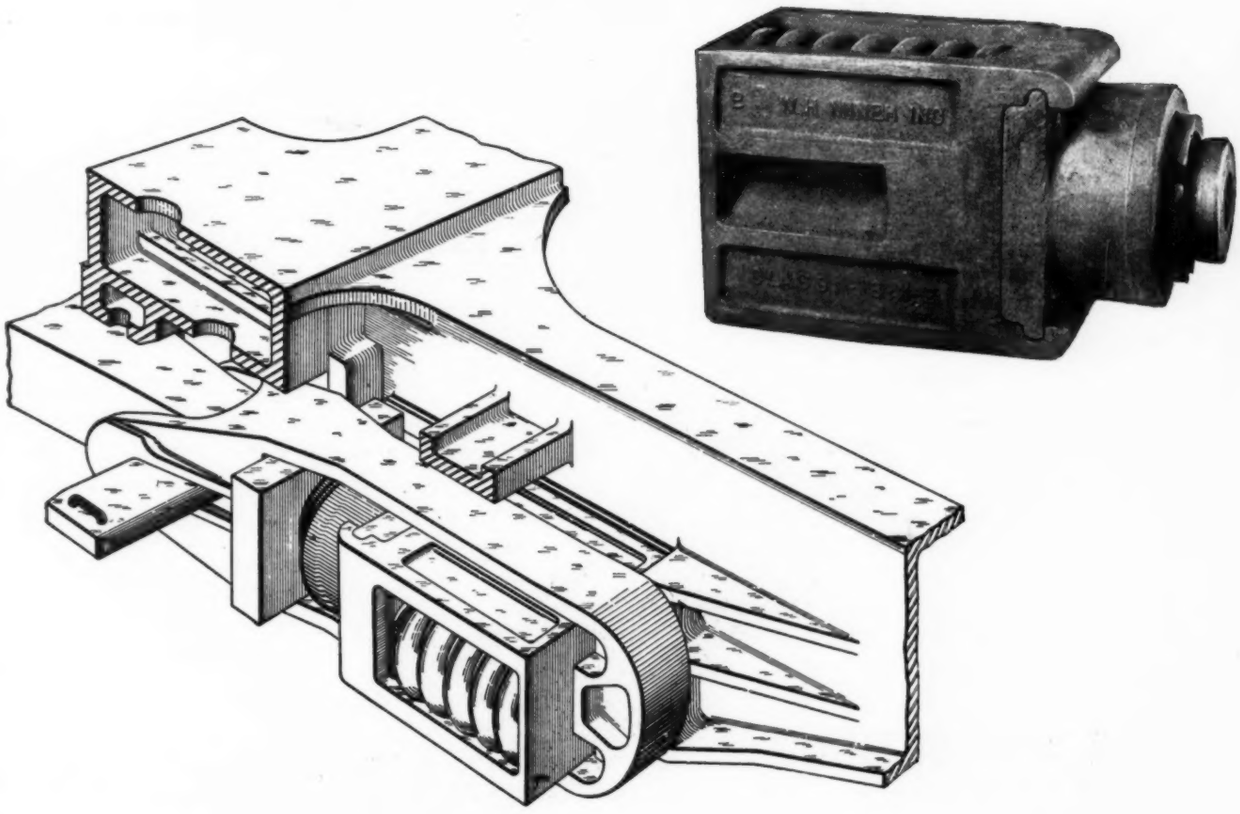
Alphabetical Index to Advertisers, Page 66 Classified Directory of Advertisers, Page 62

Volume 79 Number 26
Published Weekly by Simmons-Boardman Pub. Co., 30 Church St., New York, N. Y. Subscription Price United States, Canada and Mexico, $6.00; foreign countries (not including daily editions), $8.00; or £1.15.0, through London office; single copies, 25c. or 1s. Entered at New York, N. Y., as second-class matter.

MINER

Friction Draft Gear

Class A-18-X-2

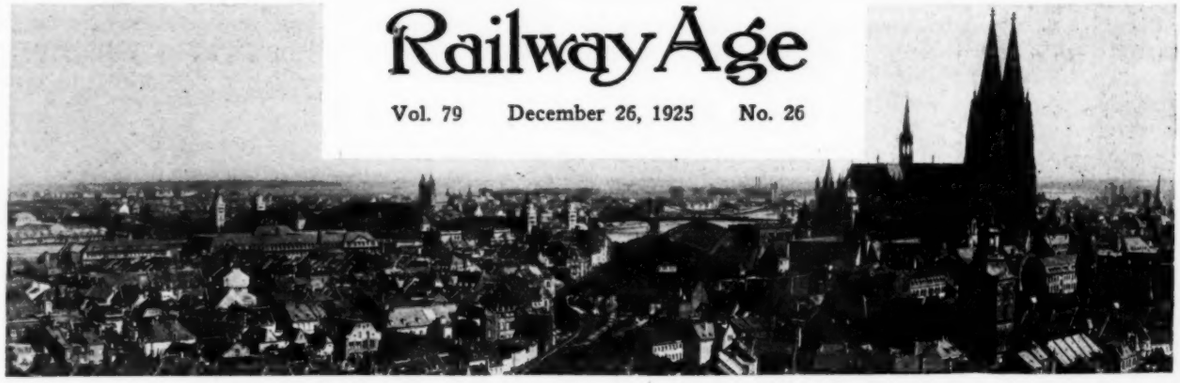


This device has great endurance, is very high in shock absorbing capacity, has ample column strength and is designed to meet every demand incident to modern transportation. It ensures every possible economy in maintaining equipment.

W.H.MINER,INC.CHICAGO

Railway Age

Vol. 79 December 26, 1925 No. 26



Railway Station at Cologne, Germany—Photoworld

Contents

Published every Saturday and daily eight times in June by the

Simmons-Boardman Publishing Company, 30 Church Street, New York

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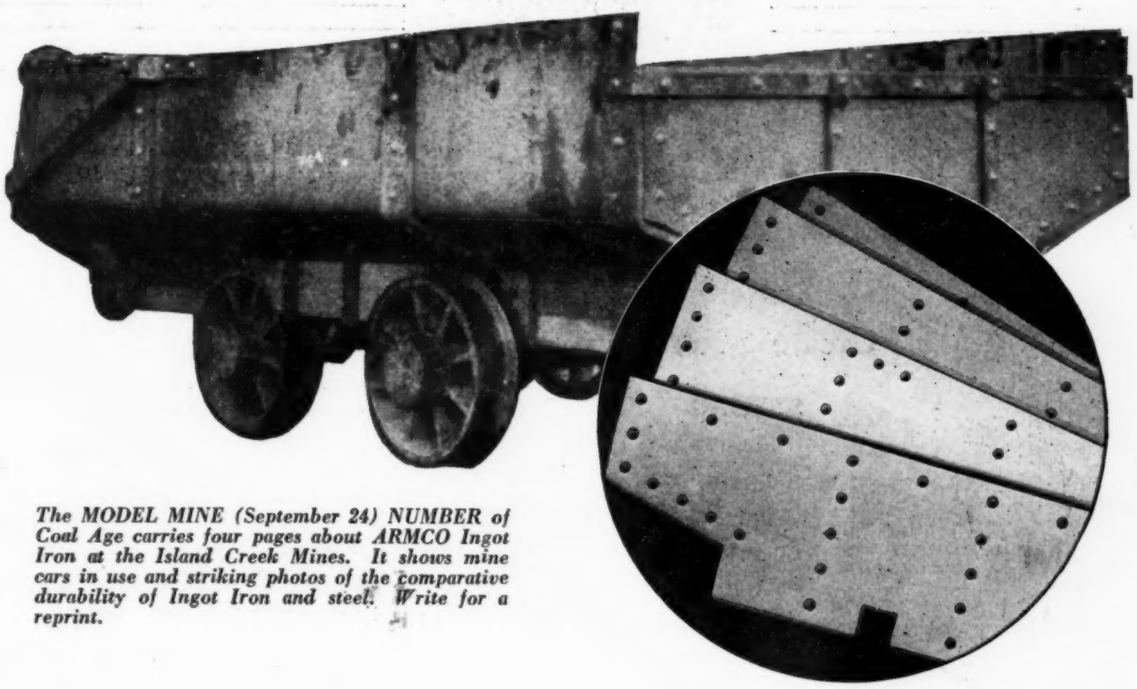


The MODEL MINE (September 24) NUMBER of Coal Age carries four pages about ARMCO Ingot Iron at the Island Creek Mines. It shows mine cars in use and striking photos of the comparative durability of Ingot Iron and steel. Write for a reprint.

Mine Car Plates—

Sheared and Punched to order

IF YOU build or repair your own cars, it will pay you to carry a supply of body plates on hand. Durable, rust-resisting, ARMCO Ingot Iron plates can be secured on order, sheared and punched to any size or design. You can also secure bodies of this iron, from leading manufacturers.

The reason for ARMCO Ingot Iron

Mine cars must be sturdy. They must stand up under the shocks of dumping, and the wear and tear of continuous hard service. And they must resist corrosion—withstand the steady attack of acidified mine water.

ARMCO Ingot Iron will do all this at the lowest possible cost per service-year. It will cut maintenance costs by eliminating too frequent repairs and replacements.

Ask us for further information about this durable iron, and our special service on punched and sheared plates.

THE AMERICAN ROLLING MILL COMPANY
Middletown, Ohio
Export: **The ARMCO International Corp.**
Cable Address: **ARMCO, Middletown**

ARMCO TRADE MARK **INGOT IRON**
The Purest Iron Made

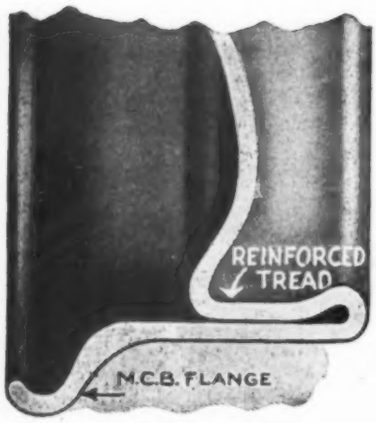
BUDA
ESTABLISHED 1881

Rolled Steel Wheels

(PATENTED)

Greatest Resistance to Wheel Load

STRONG LIGHT DURABLE



Made from Single Plate Special Open Hearth Flange Steel

Compression tests chart the Buda Disc Wheel as 50% stronger than any other rolled (or pressed) steel wheel of the same thickness and weight.

Solid Web or Disc Type

NEW FEATURES

MCB (1 inch) flange turned over to considerable depth for stiffness;

Increased thickness of flange and tread by special rolling process—an exclusive Buda feature;

Smaller holes and deeper corrugations provide greater resistance to vertical and side load;

Hubs tapered on outside to provide perfect fit to machined (not punched) hole in web;

Hubs closely fitted to web corrugations. Eliminates strain on rivets;

Bosses on hubs provide flat seating for rivet heads.

Punched Web Type

REGULAR FEATURES

MCB cone tread insures ease in rounding curves;

DOUBLE TREAD with DIRECT WEB SUPPORT maintains running surface in true circle indefinitely. Insures long life.

NO DENTING OR FLAT SPOTS.

Web: Corrugations of unusual depth insure extreme resistance to side and vertical loads.

Hub: Taper pressed fit to machined hole in web. Hot riveted. Bosses underneath rivet insure tight fit.
No strain on rivets—perfect fit to web corrugations.

BUDA ROLLED STEEL WHEELS are furnished for all types of Railroad Motor Cars, Hand and Push Cars and Velocipede Cars.

THE BUDA COMPANY

HARVEY (Chicago Suburb) ILLINOIS

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Railway Exchange ST. LOUIS
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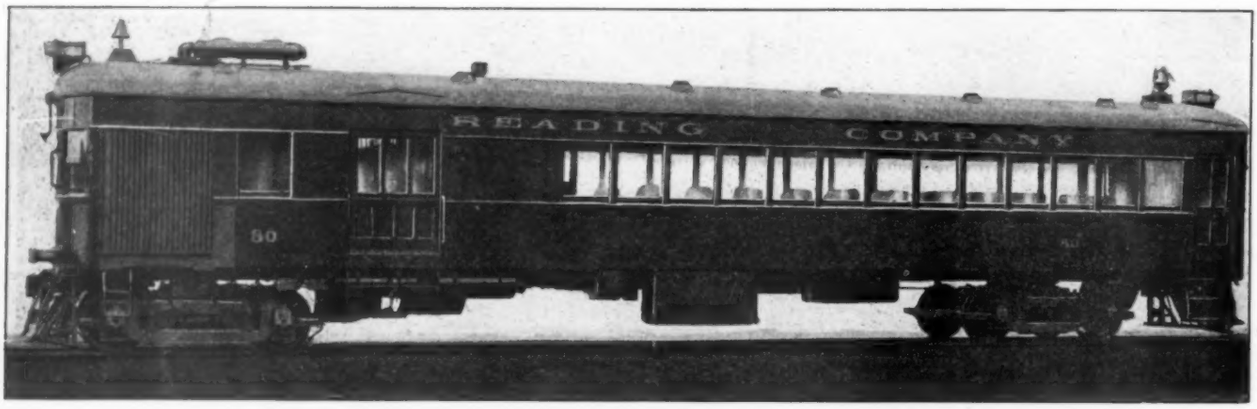
LONDON



Investigate—

Brill Gas-Electric cars are designed to meet requirements on short and branch lines where capacity and power are important factors. Equipped with a 250 Hp. engine of Brill design, directly connected to a 160 Kw. Generator, the type car illustrated leaves nothing to be desired in this respect.

Just this type of self-propelled car has been sought by the railroads for years. In design and construction it generally conforms to railroad passenger equipment, and at the same time affords an opportunity to provide service on short and branch lines at a cost consistent with available business.

Power Plant:
250 Hp. Engine
160 Kw. Generator

Investigate—we will be glad to send you complete information on our various types of Self-propelled Cars.

AUTOMOTIVE CAR DIVISION

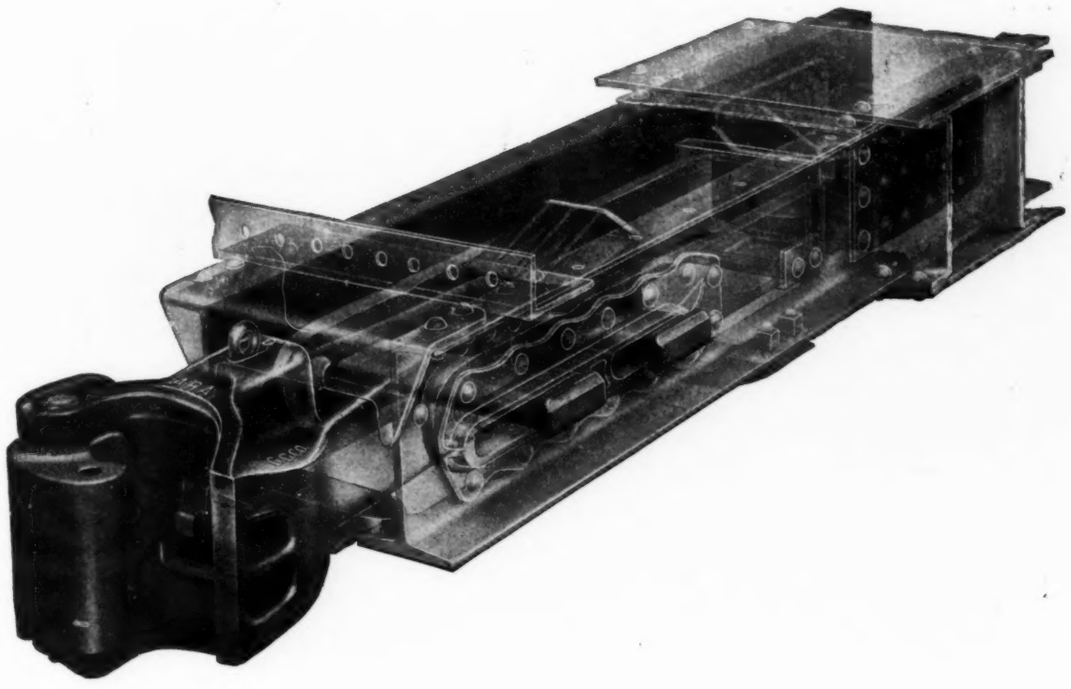
The J. G. Brill Company

Philadelphia, U. S. A.

Brill Self-Propelled Cars

FARLOW

DRAFT ATTACHMENTS



A DRAFT GEAR CROSS-HEAD

UNDER both pull and buff, the Farlow Follower Block acts as a cross-head, transmitting all loads uniformly over the face of the draft gear.

This eliminates excessive wear due to angular closing of the gear.

THE SYMINGTON COMPANY

Farlow Draft Gear Attachments Gould Automatic Brake-Slack Adjuster Malleable Iron Journal Boxes

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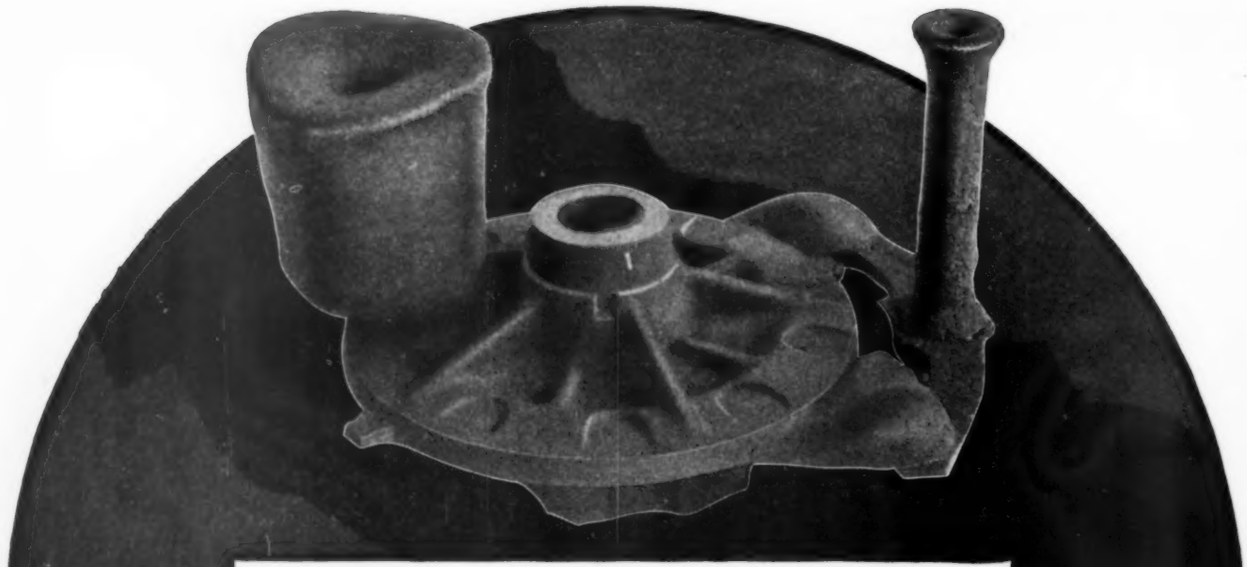

A differential casting with two feeders to insure freedom from shrinks and hidden defects In some cases the riser metal weighs twice as much as the casting and ranges from that extreme down to half the weight. These extra precautions to insure sound castings often account for the slight difference in cost between Certified Malleables and the ordinary kind.

Certificate Holders for the Quarter Ending Sept. 30, 1925

Albany Malleable Iron Co. ..... Voorheesville, N. Y.
Albion Malleable Iron Co. ..... Albion, Mich.
American Chain Co. ..... Bridgeport, Conn.
American Malleable Castings Co. ..... Marion, O.
American Malleables Co. ..... Lancaster, N. Y. and Owosso, Mich.
Badger Malleable & Mfg. Co. ..... South Milwaukee, Wis.
Baltimore Malleable Iron & Steel Casting Co. ..... Baltimore, Md.
Belle City Malleable Iron Co. ..... Racine, Wis.
Chain Belt Co. ..... Milwaukee, Wis.
Chicago Malleable Castings Co. ..... West Pullman, Chicago, Ill.
Columbia Malleable Castings Co. ..... Columbia, Pa.
Columbus Malleable Iron Co., The ..... Columbus, O.
Danville Malleable Iron Co. ..... Danville, Ill.
Dayton Malleable Iron Co. ..... Dayton, O., Ironton, O., and Canton, O.
Decatur Malleable Iron Co. ..... Decatur, Ill.
Devlin Mfg. Co., Thomas ..... Philadelphia, Pa.
Eastern Malleable Iron Co., The— ..... Naugatuck Malleable Iron Works, Naugatuck, Conn.; Bridgeport Malleable Iron Works, Bridgeport, Conn.; Troy Malleable Iron Works, Troy, N. Y.; Wilmington Malleable Iron Works, Wilmington, Del.; Vulcan Iron Works, New Britain, Conn.
Erie Malleable Iron Co. ..... Erie, Pa.
Federal Malleable Co. ..... West Allis, Wis.
Fort Pitt Malleable Iron Co. ..... Pittsburgh, Pa.
Fraser & Jones Co. ..... Syracuse, N. Y.
General Electric Co. ..... Erie, Pa.
Glancy Malleable Corporation ..... Waukesha, Wis.
Illinois Malleable Iron Co. ..... Chicago, Ill.
Iowa Malleable Iron Co. ..... Fairfield, Ia.
Kalamazoo Malleable Iron Co. ..... Kalamazoo, Mich.
Laconia Car Co. ..... Laconia, N. H.
Lakeside Malleable Castings Co. ..... Racine, Wis.
Link-Belt Co. ..... Indianapolis, Ind.
Marion Malleable Iron Works ..... Marion, Ind.
Moline Malleable Iron Co. ..... St. Charles, Ill.
National Malleable & Steel Castings Co. ..... Cleveland, O., Chicago, Ill., Indianapolis, Ind., Toledo, O., E. St. Louis, Ill.
Northern Malleable Iron Co. ..... St. Paul, Minn.
Northwestern Malleable Iron Co. ..... Milwaukee, Wis.
Peoria Malleable Castings Co. ..... Peoria, Ill.
Pittsburgh Malleable Iron Co. ..... Pittsburgh, Pa.
Rhode Island Malleable Iron Works ..... Hillsgrove, R. I.
Rockford Malleable Iron Works ..... Rockford, Ill.
Stow-Meehan Foundries, The ..... Chattanooga, Tenn.
St. Louis Malleable Casting Co. ..... St. Louis, Mo.
Saginaw Malleable Iron Co. ..... Saginaw, Mich.
Standard Malleable Castings Co. ..... Terre Haute, Ind.
Stowell Co., The ..... South Milwaukee, Wis.
Superior Steel Castings Co. ..... Benton Harbor, Mich.
Symington Co., The ..... Rochester, N. Y.
Temple Malleable Iron & Steel Co. ..... Temple, Pa.
Terre Haute Malleable & Mfg. Co. ..... Terre Haute, Ind.
Trenton Malleable Iron Co., The ..... Trenton, N. J.
Union Malleable Iron Co., The ..... E. Moline, Ill.
Vermilion Malleable Iron Co. ..... Hoopeston, Ill.
Wanner Malleable Castings Co. ..... Hammond, Ind., and Beloit, Wis.
Warren Tool & Forge Co. ..... Warren, O.
Webster Mfg. Co., The ..... Chicago, Ill.
Wisconsin Malleable Iron Co. ..... Milwaukee, Wis.
York Mfg. Co. ..... York, Pa.
Zanesville Malleable Co. ..... Zanesville, O.

Plenty of Feeders and Risers Necessary to Produce Good Malleable Iron

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Buyers of *Certified Malleables* can be reasonably sure that their castings will be sound and solid throughout, that they will be free from shrinks and hidden defects; that every casting will be malleable in fact as well as name.

For every foundry listed on this page is under the exacting metallurgical supervision of the association's consulting engineer:—a man who guards consumers' interests by insisting that certain high standards of quality and uniformity must be maintained.

Proper Risers and Feeders to prevent shrinks and hidden defects is just one of a dozen production items required by this "Sentinel of Science."

AMERICAN MALLEABLE CASTINGS ASSOCIATION
UNION TRUST BUILDING CLEVELAND, OHIO

POSITIVE PHYSICAL PROPERTIES — AcA CERTIFIED

CERTIFIED-MALLEABLE CASTINGS

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360 ounces of prevention

Defective hearing is a serious liability to industry and transportation. Now science has a preventative—the Western Electric 3-A Audiometer.

This instrument is designed to determine the fitness of men for work in which faulty hearing might prove dangerous to themselves and others. Quick and accurate tests on a uniform basis can be made by an operator lacking medical or technical training. Deception by the person tested is at once exposed.

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Western Electric

QUALITY ELECTRICAL SUPPLIES

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Edited by Roy V. Wright and R. C. Augur under the auspices of the American Railway Association, Division V, Mechanical. The standard authority on car construction, covering all modern types, with description and illustration of the various parts. 1150 pages, size 9 x 12 inches, 2848 illustrations. 1925 edition. Cloth, $8. Leather, $10.

Locomotive Cyclopedia

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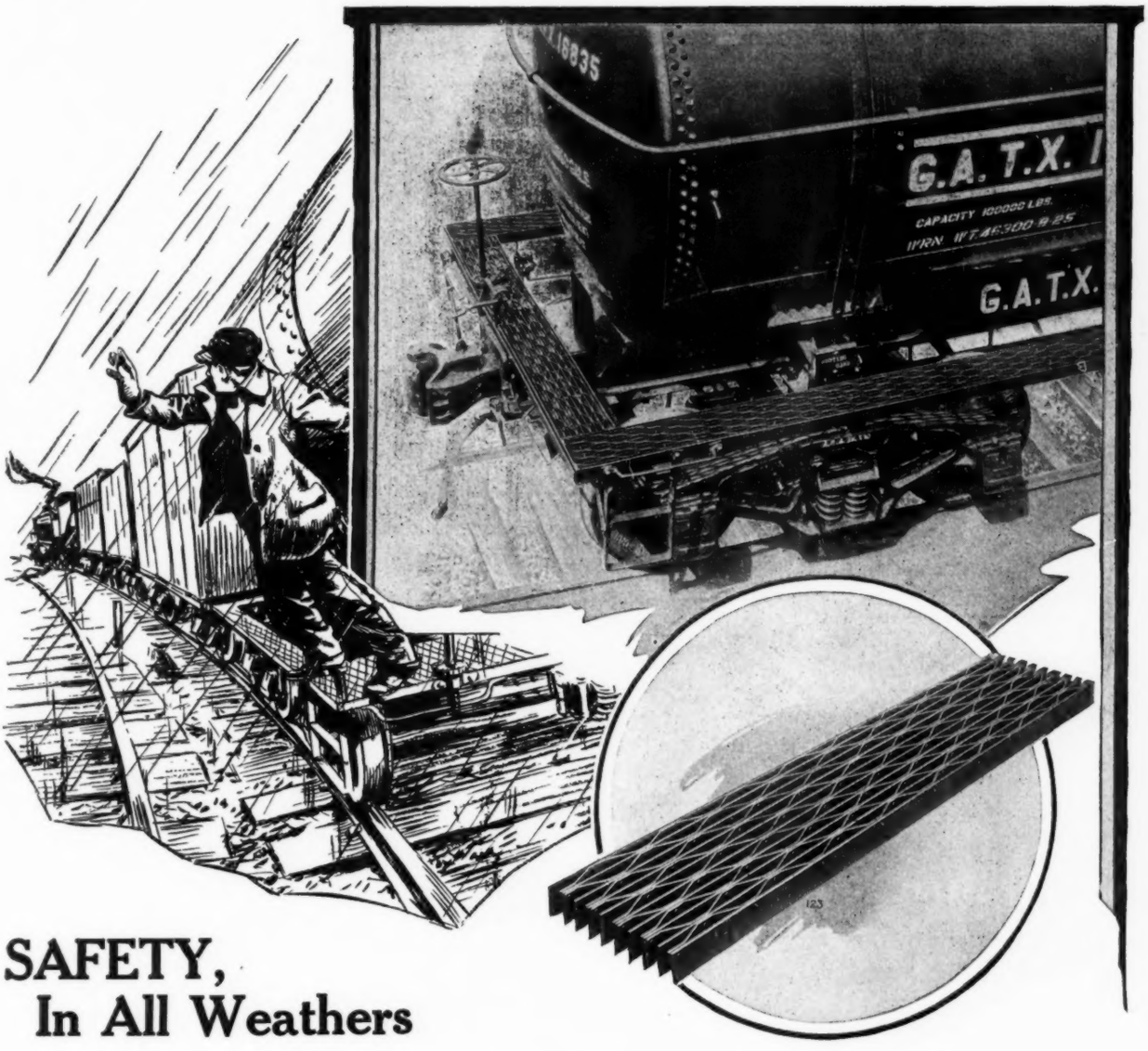
Any book on this page sent postpaid for 7 days' FREE examination

RA. 1

IRVING SAFKAR RUNWAY



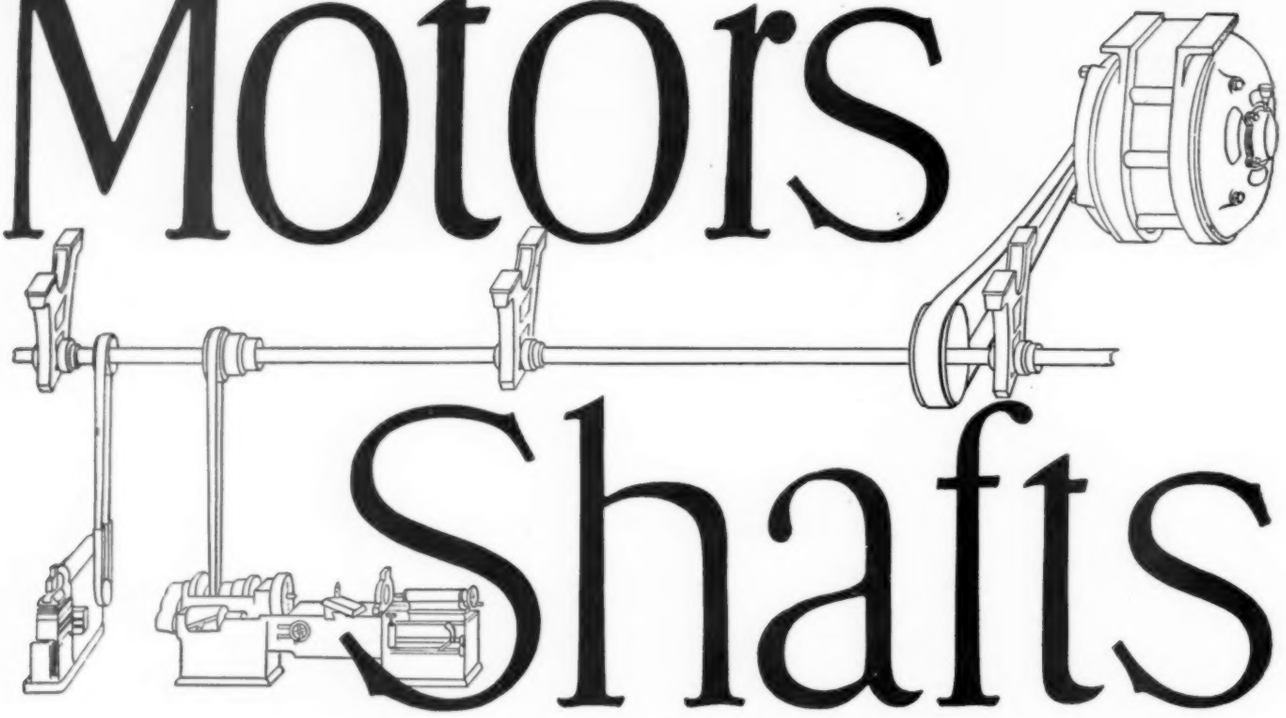
SAFETY, In All Weathers

No need for a man to "watch his step" on a car equipped with **Irving Safkar Runway**—the all-steel runway with the permanent in-built safety footing. It never gets slippery—even with oil, grease, water or snow upon it. Wear will not destroy its foot-gripping surface. Economical? Yes! Its first cost is moderate—and there are no after-costs, no up-keep, no maintenance. And this is true of all the **Irving Safkar** Products, which mean added safety to railroad men and lower maintenance for the owners.

Write for the "Safkar" Circular 33.

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y. U.S.A.

Motors Shafts Machines



Power is applied with Timken Tapered Roller Bearings in electric motors. Power is carried on Timken Bearings in shaft hangers and pillow blocks. Power is at work in Timken-equipped machinery of every sort.

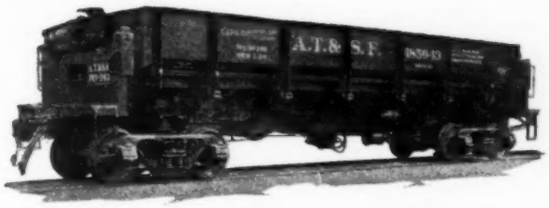
Along the whole path of production Industry economizes with Timken Bearings. They remove the drain of excess friction. Starting and running load is less. Lubrication becomes a petty item. Output is increased and improved.

Basic charges also shrink. Lighter power units and lighter belts are possible. Depreciation is halted by the faultlessly preserved position of Timken-mounted shafts, gears, and pulleys. Replacement is postponed by the extreme endurance of special Timken steel.

Throughout industry Timkens are used more and more extensively. In every type of plant Timkens can be used more and more intensively — for economical prime power, for economical power transmission, for employing power economically in every type of mechanical equipment.

THE TIMKEN ROLLER BEARING CO., *CANTON, OHIO*

TIMKEN *Tapered Roller* **BEARINGS**



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STEEL CARS
for
FREIGHT SERVICE

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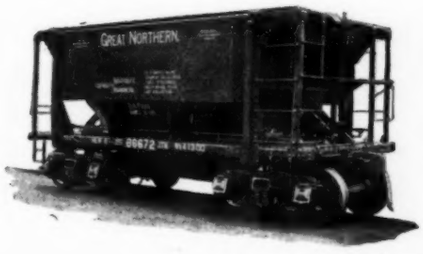
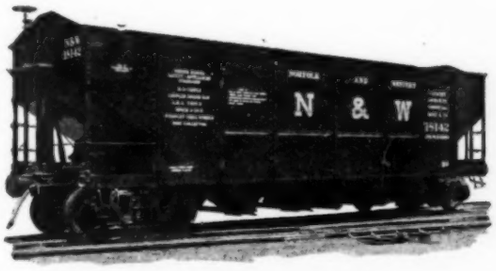
GONDOLA, HOPPER, BALLAST
TANK, FLAT, COKE, BOX
AND SPECIAL TYPES

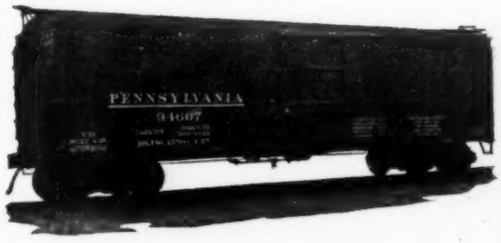
We Also Manufacture
Axles
Boiler Tubes
Car Underframes and Trucks
Car Wheels
Frogs and Switches
Rails and Accessories

We will gladly prepare specifications and estimates for cars to meet your requirements

Send us your inquiries







BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

District Offices

New York, Buffalo, Boston, Cleveland, Philadelphia, Detroit, Baltimore, Cincinnati, Washington, Chicago, Atlanta, St. Louis, Pittsburgh, San Francisco, Los Angeles, Seattle

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of Our Commercial Products

BETHLEHEM

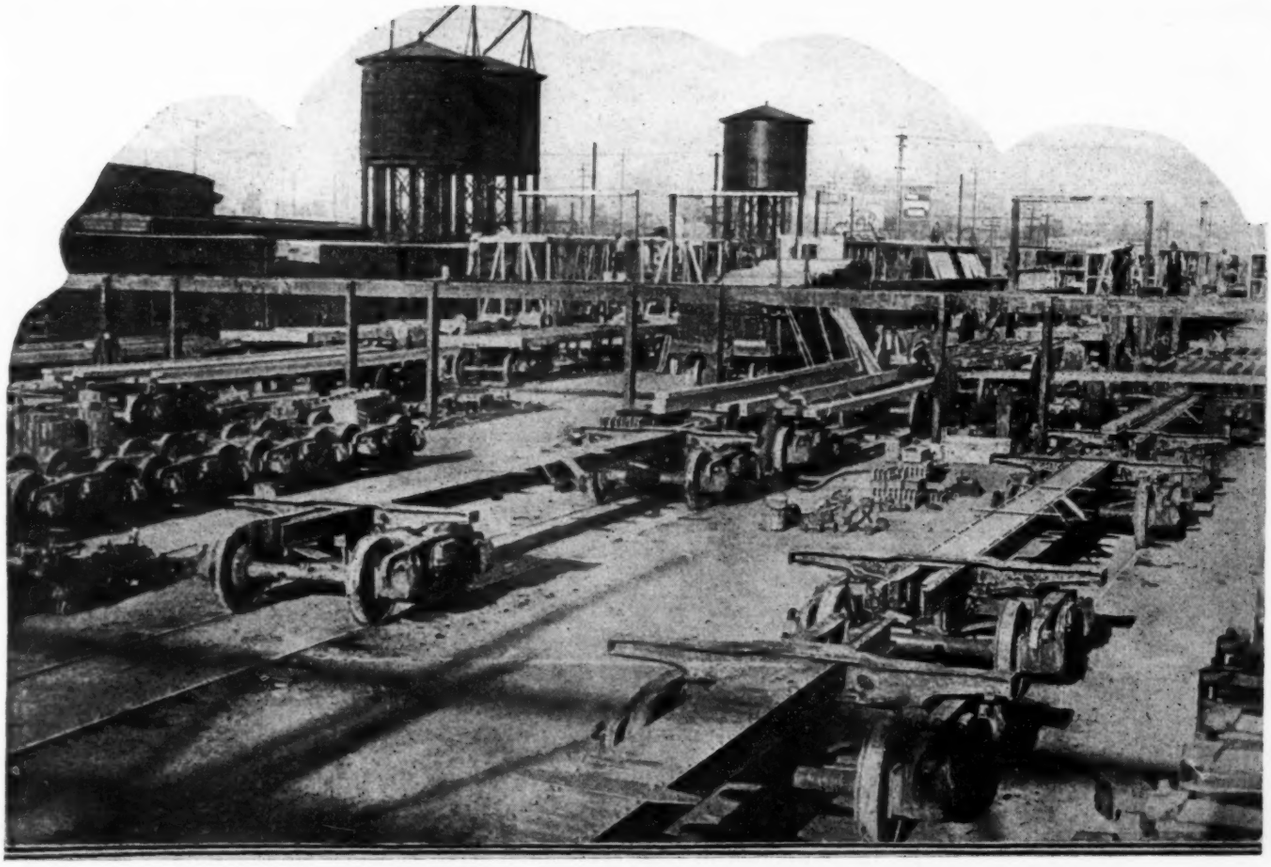
Final Inspection

(No. 8 of a Series)

After finishing the manufacturing operations, before being sent to the warehouse, each Gary Wrought Steel Wheel is given a final inspection which consists of a complete and very careful examination of each wheel. This work is performed by a thoroughly trained organization, directed by men of long experience in the production of wrought steel wheels. Each wheel is examined in detail for any evidence of steel defects. The machined tape size is stenciled on the wheel, and it is then ready for application on an order, or to be placed in stock.

The rigid care exercised in every detail of the several operations of forging, rolling and machining and the unusually careful inspections are the factors responsible for the Multiplied Mileage found in Gary Wrought Steel Wheels.

Illinois Steel Company
General Offices, 208 So. La Salle St.
Chicago, Illinois



In Car Building or Repairing

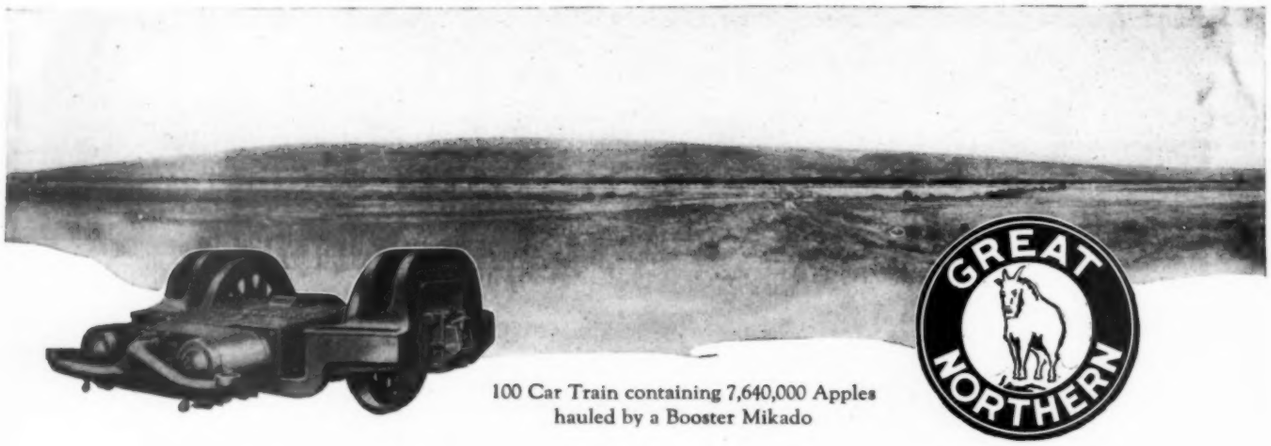
RALSTON SERVICE
INSURES
MANY IMPORTANT ECONOMIES

MANY distinctive economies are being reflected daily in the operating and maintenance costs of freight train cars rebuilt under the Ralston plan. Elimination of unnecessary weight lessens the cost per train mile. Strengthening of weak features of original construction and proper distribution of weight minimizes wear and results in longer car life with less attention and fewer replacements.

The surprising thing about Ralston Service is that cars needing any great amount of repairing can be practically rebuilt at the Ralston plant for almost the same money it would cost to make major repairs in the railroad shop—the big difference is that a Ralston rebuilt car will often give longer and more satisfactory service than the original car.

Each year more railroads are getting better acquainted with Ralston—it pays.

THE RALSTON STEEL CAR CO.
COLUMBUS OHIO



100 Car Train containing 7,640,000 Apples
hauled by a Booster Mikado

The GREAT NORTHERN

Making Operating Records

Boosters Help Locomotive Performance

WELL to the fore in the splendid operating records being made by American railroads stands the Great Northern.

Among their recent achievements is a continuous run of 1,783 miles from Seattle to St. Paul in 52 hours, 32 minutes. Turning around in a few hours the same locomotive started West on the fast mail and travelled the 1,793 miles back to Seattle in 47 hours, 10 minutes. The total distance of 3,576 miles was covered at an average speed of 35.98 miles per hour.

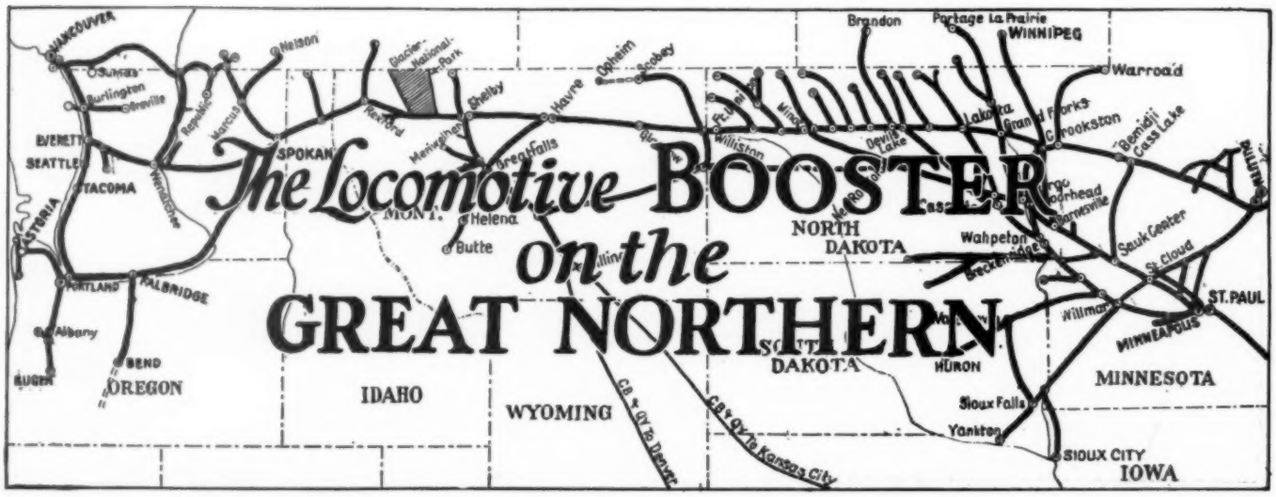
Another unusual record is pictured above where Booster Mikado 2121 is hauling 100 cars of apples, 764 boxes to the car, 100 apples to the box, 7,640,000 apples in all. The Booster assists in starting this train and helps at critical points on the road.

Such remarkable operating performances are made possible by modern locomotives equipped with Locomotive Boosters.

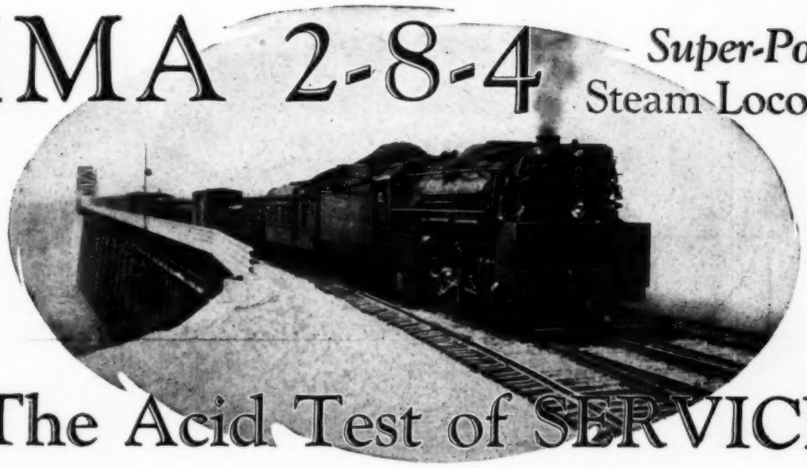
The Great Northern has a large number of Locomotive Boosters in operation, speeding train movement and reducing operating costs.

Franklin Railway Supply Company, Inc.

New York Chicago St. Louis San Francisco Montreal



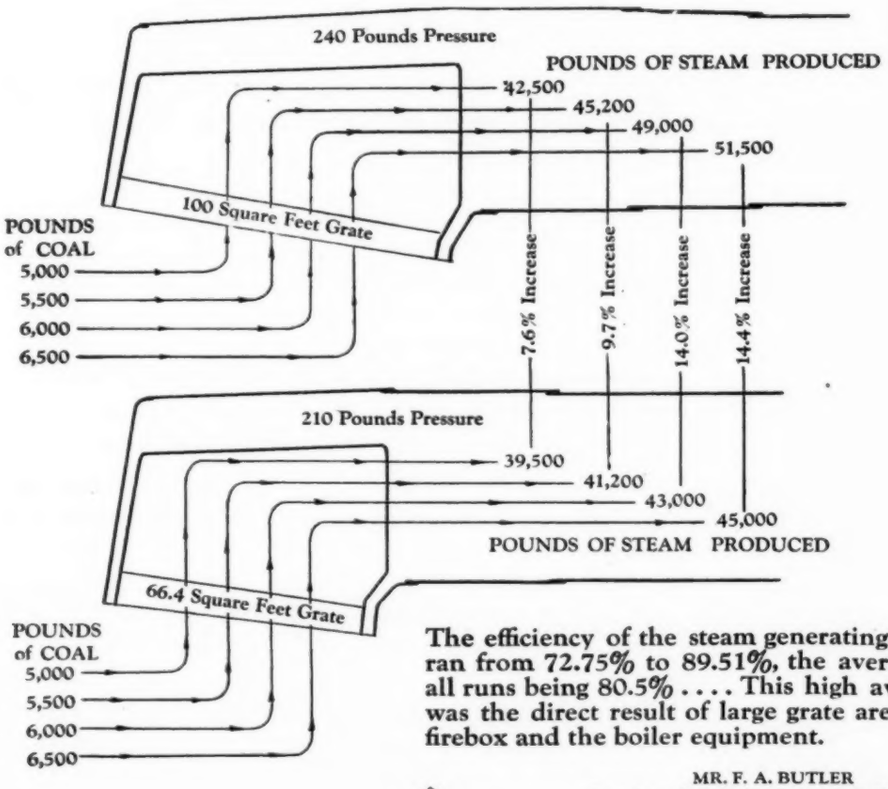
LIMA 2-8-4 *Super-Power* Steam Locomotive



The Acid Test of SERVICE

Large Grate Areas Produce More Steam From the Same Amount of Coal

Road Tests Under Normal Operating Conditions of Two Boilers. One with 100 square feet of Grate and One with 66.4 square feet of Grate



The efficiency of the steam generating plant ran from 72.75% to 89.51%, the average of all runs being 80.5% .... This high average was the direct result of large grate area and firebox and the boiler equipment.

MR. F. A. BUTLER
Superintendent Motive Power & Rolling Stock
BOSTON & ALBANY RAILROAD
Railway Age, Sept. 12th, 1925

LIMA LOCOMOTIVE WORKS INCORPORATED

One Road Uses Twice As Many New Boiler Tubes As Its Neighbor

TWO well known roads, operating in the same locality, have accurate records of their boiler tube service over a number of years.

With feed water conditions practically equal, one road used 28 new tubes per locomotive per year. The other road used only 10 new tubes per locomotive per year!

There was a reason for the second road's smaller tube requirements—they used Charcoal Iron Boiler Tubes. For longer tube service, less frequent replacements and fewer idle locomotive hours, specify longer-lasting, corrosion-resisting Charcoal Iron Parkesburg Tubes.

If you are not now using Charcoal Iron Tubes try a few sets of Parkesburgs.

The Parkesburg Iron Company

Parkesburg, Pa.

BRANCH OFFICES

New York, 30 Church Street — Boston, Oliver Building
Cleveland, 840 Rockefeller Building — Chicago, Fisher Building
Philadelphia, Commercial Trust Building — St. Louis, Security Building
San Francisco, Rialto Building — Montreal, New Birks Building
St. Paul, 906 Merchants Bank Building

EXPORT AGENTS

Wonham, Bates & Goode Trading Corporation, New York

WABCO — the *super* Packing Cup

"NO CYLINDER LEAKAGE SINCE WABCO CAME"

WABCO'S Sterling performance has won it the endorsement of Air Brake maintenance men as the SUPER Brake Cylinder packing Cup.

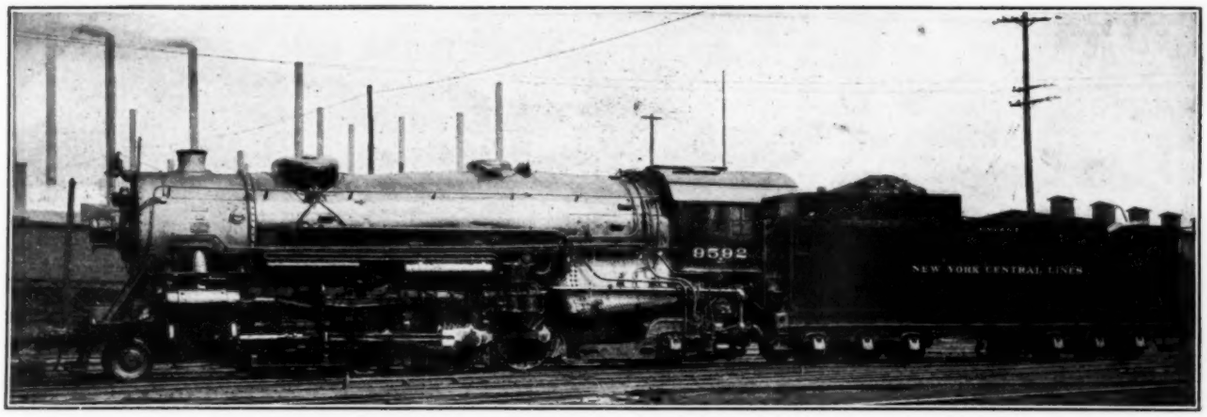
Brake Cylinder leakage from ordinary causes is eliminated when Wabco Cups are used, because ORDINARY CAUSES have no effect on Wabco!

Wabco Cups retain their efficiency under all temperatures encountered in train operation, and are water and oilproof. They give immeasurably longer service than the usual grade of packing cups. And while giving longer service they give BETTER SERVICE!

WESTINGHOUSE AIR BRAKE CO.

General Office and Works, Wilmerding, Pa.

New York Washington Pittsburgh Chicago St. Louis San Francisco



Make your old motive power earn more revenue!

You don't need to wait until new locomotives can be purchased to realize the benefits of mechanical firing.

Without disturbing the normal arrangement of grate or fire door, or requiring special preparation, any locomotive now in service can be readily equipped with the DUPLEX STOKER.

Fuel may then be continuously supplied to the entire grate surface uniformly, at the rate of combustion, so as to maintain a bright, thin, clean fire, and the locomotive can be worked to full capacity. This permits the hauling of heavier tonnage trains and the making of better time over the road.

8,000 of our Stokers in Service, 6,300 of them Duplexes

REGISTERED LCS TRADE MARK

Many railroads have revitalized their old motive power by installing Duplex Stokers, thereby increasing the tonnage ratings of the locomotives 15 to 30%. The additional revenue thus produced has paid for the Stoker in a few trips. Since then it has been all profit.

LOCOMOTIVE STOKER CO.

Manufacturers of Duplex Stokers, Elvin Shovel Type Stokers, Mechanical Coal Pushers

Main Office and Works—30 General Robinson Street, West, Northside, PITTSBURGH, PA.

Westinghouse Bldg.
150 Broadway
NEW YORK

Munsey Bldg.
1329 "E" St., N. W.
WASHINGTON

Railway ExchangeBldg.
80 E. Jackson Blvd.
CHICAGO

HULSON

In Use On 2

701 Locomotives Equipped 1

THE fact that 701 locomotives have been equipped with Hulson Grates up to November 1, 1925, proves beyond the shadow of doubt that they fill the need today for efficient grate service. They have materially lowered maintenance cost, reduced fuel consumption, and are responsible in a large measure for the success of extended locomotive runs.

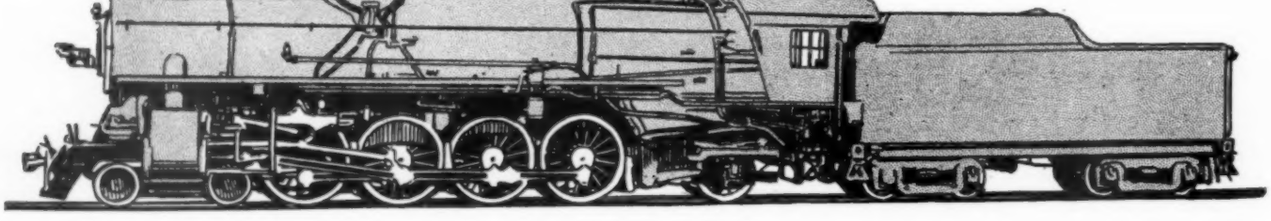
The loose finger feature of Hulson Grates insures a substantial reduction in maintenance cost. Several roads report a saving of 75% in grate upkeep since their application. One large Class I road reports that in thirty shoppings of Hulson equipped locomotives, grate repairs average $3.19 per engine against a former average cost of $32.74 per engine.

Hulson Grates are designed to give 70% additional air space over the ordinary grate. This feature insures proper combustion, cleaner fires, and more efficient locomotive performance, all of which leads to a reduction in fuel consumption. A leading railroad reports that in one year, Hulson Grates have resulted in a fuel saving of $113,112.00.

The easy rolling action of Hulson Grates together with the efficient combustion obtained, lead several roads to make tests with the purpose in view of extending locomotive runs. One road after a test run of 2,645 miles, without cleaning the fire, entered into a program of extended locomotive runs, which resulted in releasing 30 locomotives from 50 trains.

Hulson Grate

Keokuk,



GRATES

On 21 Railroads

ped 1650 Sets Ordered

THE fact that 1,650 sets of Hulson Locomotive Grates have been ordered prove that their merits have met with recognition and that they meet the requirements for higher locomotive efficiency. The ever increasing orders for Hulson Grates for use on new power, stationary boilers and locomotives already in service, necessitated enlarging our facilities to insure increased production.

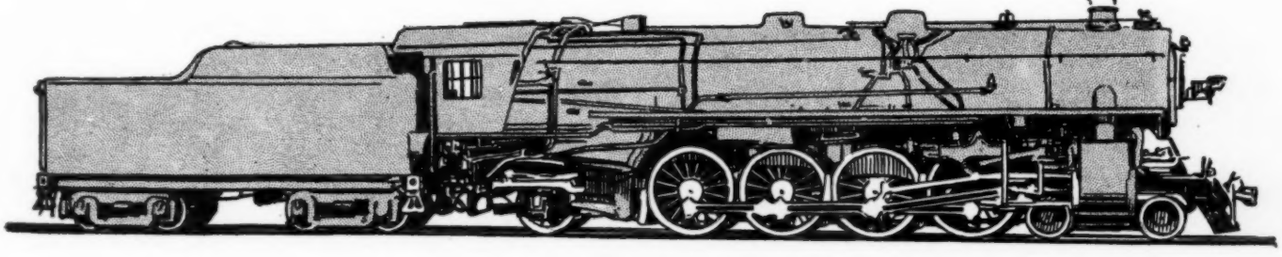
Roads that have come to know the economies effected by Hulson Grates, specify them on all new equipment. To date 145 sets have been furnished the builders for application on new locomotives. They can also be applied through the firebox door, to any style of grate arrangement in a few hours, either in your roundhouse or back shop.

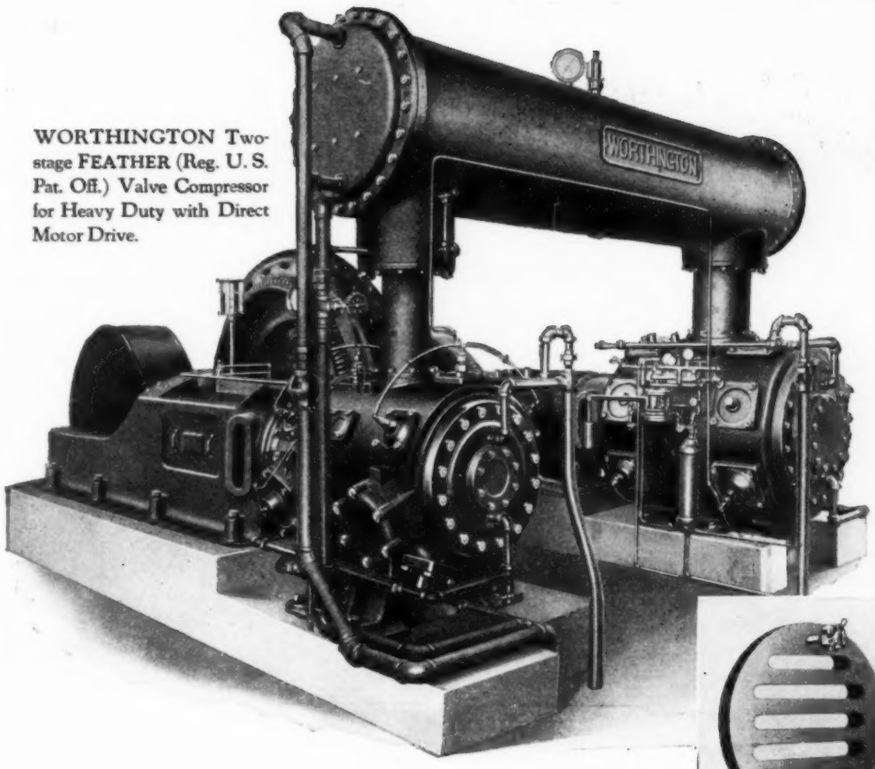
Another problem that is met by Hulson Grates is the Standardization of parts and the reduction of stock carried. The number of grate castings necessary is reduced 50% when Hulson Grates are made standard equipment. Roads that use them on their locomotives also use them in their boiler rooms and power plants, there being 2,000 sets in use at the present time.

Our enlarged Foundry and Assembling Plant put into operation August 15, 1925, is modern in every respect and is equipped for the exclusive manufacture of Hulson locomotive and stationary boiler grates, on a production basis. Our trained Engineering and Service Department is at your service and will gladly assist you in obtaining Hulson Grate economy. Further information will be sent interested officials upon request.

e Company, Inc.

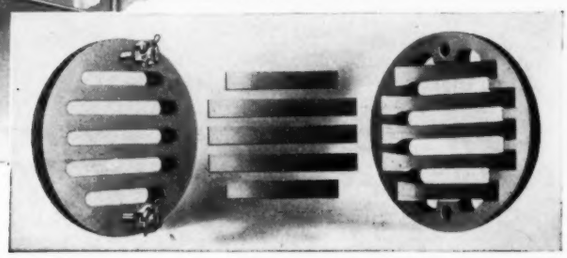
k, Iowa





WORTHINGTON Two-stage FEATHER (Reg. U. S. Pat. Off.) Valve Compressor for Heavy Duty with Direct Motor Drive.

The FEATHER Valve with cover removed.



The relation of dollars to temperature

IN the average railroad shop the demand for air is seldom constant for any period of time. It may vary back and forth from 25 per cent to over 100 per cent of full capacity throughout the entire working day; and the compressor that can furnish cool air at partial capacity will have the greatest operating success.

With the new type of variable capacity control on the two-stage Worthington FEATHER Valve Compressor *the temperature under light load is actually less than under full load.* Consider what this means besides power consumption proportioned to the demand for air. It means less current per cubic foot of air delivered, less danger of carbonized oil under valve elements, better lubrication — in short, *it means cheaper air.*

Now add this advantage to the other excellent features of the Worthington Compressor:—

The FEATHER Valve shown in the insert. These light steel strips have a long life. They are quickly replaceable at a cost of a few cents.

Water-jackets designed to allow ample circulation and easy access for removing scale.

Full quarter-box bearings with provision against misalignment of shaft when taking up wear.

Forced-feed lubrication of cylinders.

Worthington FEATHER Valve heavy duty Compressors are arranged for belt or direct-connected motor drive. For those who prefer steam drive we recommend our highly economical uniflow unit.

WORTHINGTON PUMP AND MACHINERY CORPORATION
115 BROADWAY, NEW YORK CITY
BRANCH OFFICES IN 24 CITIES

WORTHINGTON

R.A. 4729-2

WORTHINGTON PUMP AND MACHINERY CORPORATION
115 Broadway, New York City

☐ Please send me bulletin L538A describing Motor Driven Compressor.
☐ Please send me bulletin L542 describing the FEATHER (Reg. U. S. Pat. Off.) Valve Uniflow Compressor.

Name_____

Title_____

Company_____

Address_____

This Pacific, one of an order of twelve for a mid-western road, has 23% greater tractive effort than the road's previous locomotives of the same type. Yet driver weight is only 1% greater, and the increase in the total locomotive weight, only 6%.

Can You Get Greater Tractive Effort—

and Still Keep Within Weight Limits?

OPERATING officials are calling for new power of greater tractive effort.

To supply the additional power without additional excessive weight is the problem of the locomotive designer.

By careful design, and the use of lighter-section forgings of Carbon-Vanadium Steel, many locomotive designers are solving the problem.

Recently, twelve new Pacifics were built for a mid-western road, with 23% greater tractive effort than previous locomotives of the same class. Yet, the increase in driver weight was only 1%, and in the total locomotive weight, only 6%. 1,343 pounds were saved per locomotive, principally through the use of Carbon-Vanadium Steel in a number of important forgings.

If you are interested in reducing locomotive weight, ask us to send you data on weight-savings that Carbon-Vanadium has helped to effect.

Send for a copy of "Vanadium Steel in New Locomotives", containing illustrations of 58 locomotives. These locomotives, built for 33 roads, represent orders totaling 1028 locomotives equipped with Carbon-Vanadium Forgings or Vanadium Steel Frames.

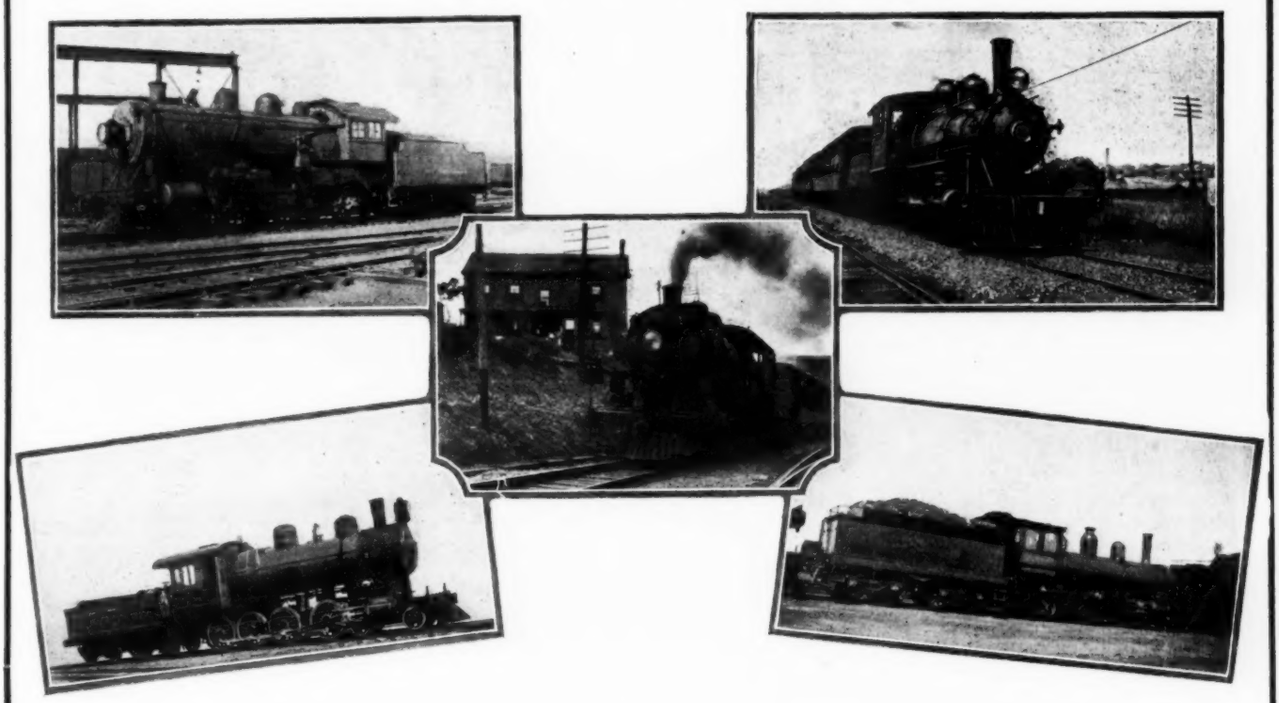
VANADIUM CORPORATION OF AMERICA

NEW YORK
120 Broadway

DETROIT
Book Bldg.

VANADIUM STEELS

for strength, toughness and durability



17,000

Candidates, like those shown above, have been converted to superheated steam operation. This has resulted in keeping many of the smaller ones in service, that otherwise would have been displaced owing to heavier duty requirements.

There are yet many very promising candidates in service that will meet requirements for years to come — if revitalized with superheaters.

Any of those old locomotives on your road, **even if they are good for only two years more service,** are candidates for superheaters.

Are those candidates on your program for superheaters?

THE SUPERHEATER COMPANY

17 East 42nd Street
NEW YORK

ELESCO

Peoples Gas Building
CHICAGO

Canada: The Superheater Company, Limited, Montreal

FEED WATER HEATERS SUPERHEATERS EXHAUST STEAM INJECTORS

PROFESSIONAL DIRECTORY

BATTEY & KIPP
INCORPORATED
Engineers
Complete Railroad Shops and Locomotive Terminals
Power Plants
Industrial Properties
123 W. Madison St., Chicago

DAY & ZIMMERMANN
Incorporated
Engineers
Railroad Shops and Terminals, Power Plants
Industrial Plants
New York PHILADELPHIA Chicago

McClellan & Junkersfeld
Incorporated
ENGINEERING AND CONSTRUCTION
Power Developments—Electrifications
Industrial Plants—Examinations
Reports
NEW YORK
68 Trinity Place
Chicago St. Louis Washington

HUMAN ENGINEERING
Railway Audit
&
Inspection Company, Inc.
Franklin Trust Building
Philadelphia
BRANCHES
Boston New Orleans
New York Pittsburgh
Baltimore Chicago
Atlanta St. Louis

John Balch Blood
Economist
Statistics Valuation
Engineering Reports
1808 Eye Street, N. W.
Washington, D. C.

JOHN E. MUHLFELD
Consulting Engineer
RAILWAY AND INDUSTRIAL EQUIPMENT, FACILITIES, INVESTIGATIONS AND VALUATIONS
25 Broad Street, New York

C. E. SMITH & CO.
Consulting Engineers
2073 Railway Exchange, St. Louis
Investigations, Reports, Appraisals, Expert Testimony, Bridge and Structural Work, Electrification, Grade Crossing Elimination, Foundations, Docks, Water Supply, River and Flood Protection, Drainage and Sanitation.

ROBERT W. HUNT COMPANY
Engineers
INSPECTION—TESTS—CONSULTATION
INSPECTION OF
RAILS, STRUCTURES, CARS, LOCOMOTIVES AND ALL RAILWAY MATERIAL
Chemical, Cement and Physical Testing Laboratories
New York Pittsburgh CHICAGO St. Louis Kansas City
Seattle London Montreal Toronto San Francisco

DWIGHT P. ROBINSON & COMPANY
INCORPORATED
with which is consolidated
Westinghouse, Church, Kerr & Co., Inc.
Design and Construction of
Shops, Terminals, Power Plants, Electrification
STUDIES, REPORTS, APPRAISALS 125 EAST 46th ST., NEW YORK
Chicago Los Angeles

Exceptional Opportunities

By using a small card in the Professional Directory at a nominal cost, you will reach almost every important Railway Officer. The men interested in the professional service you have to offer. Take advantage of this opportunity and keep your name before them for ready reference.

Ask us for more details and rates

Help and Situation Wanted advertisements appearing in this Department are payable in advance at 5c. a word an insertion, and 5c. per word for eleven words in address, Minimum charge $1.00 an insertion. Display Help and Situation Wanted advertisements $3.00 a column inch (1" deep x 1⅝" wide) an insertion. For sale and other Classified Advertisements $3.60 a column inch (1" deep x 1⅝" wide). Any number of inches may be used. Copy should be in the New York Office of the Railway Age, 30 Church Street, by Saturday noon to insure insertion in the following week's issue.

POSITION OPEN

SALARIED positions $2,500 to $25,000 upward; executive, technical, administrative, engineering, manufacturing, professional, financial, etc., all lines. If qualified, and receptive to tentative offers, you are invited to communicate in confidence with the undersigned, who will conduct preliminary negotiations. A method is provided through which you may receive confidential overtures, without jeopardizing present connections, and in a manner conforming strictly to professional ethics. Established 1910. Send name and address only for preliminary particulars. No obligation. R. W. Bixby, Inc., 268 Main St. (Suite 802), Buffalo, New York.

POSITION OPEN

WANTED: Metallurgist; Chemist who has had experience in foundry practice. Address, stating age, experience, reference, and salary expected. Mt. Vernon Car Manufacturing Company, Mt. Vernon, Ill.

POSITION WANTED

SHORT LINE RAILROAD EXECUTIVE now employed seeks new connection after January 1st, 1926. Familiar with I. C. C. Rules and Regulations governing steam railroads. Thirty-eight years of age, married and in good health. Twenty-one years' experience covering operation, finances, traffic and accounting. Capable assuming full charge short line railroad (or any department). Good record, efficient and economical operation. References upon request. Address Box 792, RAILWAY AGE, 30 Church Street, New York.

EDUCATIONAL

SEND for Free Special Bulletin and learn how to increase your knowledge of practical railroad work and fit yourself for promotion. The Railway Educational Bureau, Omaha, Nebr.

Take advantage of space in these columns

NEW and RELAYING RAILS
1 TON OR 1000
TRACK EQUIPMENT — L.B. FOSTER CO. — RAIL ACCESSORIES
PITTSBURGH - PENNSYLVANIA
NEW YORK · JERSEY CITY · PHILADELPHIA · HAMILTON, O.

WANTED

Second-hand steel Pullman Railway Coach, for private use. Must be in good condition. Address, A. B. Ayres, 224 S. Main Street, New Castle, Indiana.

Use the Classified Directory for Results

For Sale Quick

1—60" Bement Duplex Control Boring, Drilling and Milling Machine. 1 No. 10 Bement Vertical Milling Machine. Both electric driven 220 volt motors.
For prices and particulars apply Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

RAILS—LOCOMOTIVES—CARS

Inspected and Guaranteed

Get our prices on H-M Select Used Railway Equipment and H-M Relaying Rails.
30% to 50% saving. All weights. Stocks at our 4 yards. Prompt shipment made from yard nearest destination saves freight.
Locomotives and cars of every type in serviceable condition.

Hyman-Michaels Company
People's Gas Bldg., Chicago
New York St. Louis Pittsburgh
San Francisco Dallas

The Classified Pages will bring you inquiries.

FOR SALE

1—80' Steel Girder Type Turntable manufactured by American Bridge Co. in 1918, designed for 109 ton load, live ring centre. Located at Fitchburg.

1—75' Steel Girder Type Turntable manufactured by American Bridge Co. in 1910. Located at Concord, N. H.

A. W. Munster, Pur. Agt., Boston and Maine Railroad, Boston, Mass.

REPRESENTATION

Houston, Texas, concern with first-class facilities and selling ability, well and favorably known, desires to represent producers of equipment, machinery and materials used by railroads, contractors and industrials. Address Box 525, Houston, Texas.

RELAYING RAILS 90 LB.

First quality—Open Hearth Steel
Other weights—frogs—switches—bolts—spikes—tie plates, etc.

E. C. SHERWOOD
50 Church St. New York

REBUILT EQUIPMENT

LOCOMOTIVES, STEAM SHOVELS
CRANES, CARS, COACHES, RAIL, ETC.

LARGE ASSORTMENT IN STOCK
REBUILT IN OUR OWN SHOPS

SOUTHERN IRON & EQUIPMENT COMPANY
ESTABLISHED 1889
ATLANTA GEORGIA

For Results

If you have used equipment to sell, the "Get Together Department" would be the proper place to put your advertisement.

Take advantage of these columns.

FOR SALE


600—50-Ton All-Steel Double Hopper Cars
(400 have rolled steel underframes and 200 have pressed steel underframes)
Complete specifications upon request.

BRIGGS & TURIVAS, Inc.
110 South Dearborn Street, Chicago, Illinois

Railroad Cars & Equipment, Freight Car Parts, Relaying Rails and Fastenings.
Scrapped Iron in all its Forms, New Iron and Steel, Industrial Plants and Equipment.

BUYERS INDEX

For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last page next to cover

Acetylene.
Dunham Co., Keith.

Acetylene Cylinders.
Dunham Co., Keith.

Air Lifts.
Ingersoll-Rand Co.

Aftercoolers, Air.
Ingersoll-Rand Co.

Air Reservoir Joints — (See Joints, Air Reservoir).

Alloy Steel.
Central Steel Co.

Angle Bars — (See Joints, Rail).

Angles, Channels and Tees—(See Shapes, Structural).

Arch, Locomotive Brick.
American Arch Co.

Arresters, Lightning.
Electric Service Supplies Co.
General Electric Co.
P. & M. Co., The
Western Elec. Co.

Arresters, Loco. Spark.
Mudge & Co.

Asbestos, Protected Metal.
Johns-Manville, Inc.

Ash Conveyors.
McMyler Interstate Co.

Auxiliary Locomotive.
Bethlehem Steel Co., Inc.

Axles, Car and Locomotive.
American Locomotive Co.
Baldwin Locomotive Works.
Bethlehem Steel Co.
Carnegie Steel Co.
Illinois Steel Co.
Johnson & Co., J. R.
Lima Locomotive Works.
Standard Steel Works Co.
Tennessee Coal, Iron & R. R. Co.

Axles, Mine Car.
Brill Co., J. G., The.

Barges, Steel.
American Bridge Co.

Bars, Concrete Reinforcing.
Carnegie Steel Co.
Illinois Steel Co.

Bars, Iron and Steel.
Bethlehem Steel Co.
Carnegie Steel Co.
Central Steel Co.
Falls Hollow Staybolt Co.
Illinois Steel Co.
Lockhart Iron & Steel Co.
McConway & Torley Co.
Ryerson & Son, Joseph T.
Tennessee Coal, Iron & R. R. Co.

Batteries, Electric Storage.
Western Electric Co.

Batteries, Storage.
Safety Car Heating & Lighting Co.

Batteries, Wet Cell.
Western Electric Co.

Bearings, Axles, Motor and Push Car.
Buda Co., The.
Fairmont Railway Motors, Inc.
Mudge & Co.

Bearings, Center.
Brill Co., J. G., The.
Chicago Ry. Equipment Co.
Miner, W. H.
Pressed Steel Car Co.
Symington Co., The.
Woods & Co., Edwin S.

Bearings, Journal.
Keystone Bronze Co.
More-Jones Brass & Metal Co.

Bearings, Roller.
Fairmont Ry. Motors, Inc.
Hyatt Roller Bearing Co.
Timken Roller Bearings Co., The.

Bearings, Roller Side.
Q. & C. Co., The
Standard Coupler Co.

Bearings, Side.
American Steel Foundries.
Chicago Railway Equipment Co.
Fort Pitt Malleable Iron Co.
Goodwin Side Bearing Co.
Miner, W. H.
Standard Car Truck Co.
Woods & Co., Edwin S.

Bender, Rail.
Buda Co., The.

Bending and Straightening Machines.
Ryerson & Son, Joseph T.

Billets, Steel.
Carnegie Steel Co.
Central Steel Co.
Illinois Steel Co.
McConway & Torley Co.
Tennessee Coal, Iron & R. R. Co.

Bins, Steel.
Blaw-Knox Co.

Blocks, Creosoted.
American Creosoting Co.
Century Wood Preserving Co.
Colonial Creosoting Co.
Georgia Creosoting Co.
Gulf States Creosoting Co.
International Creosoting & Constr. Co.
Jennison Wright Co.
Long-Bell Lumber Co., The.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.

Blocks, Paving.
Gulf States Creosoting Co.

Blocks and Tackle.
Western Electric Co.

Blooms.
Tennessee Coal, Iron & R. R. Co.

Blooms, Steel.
Carnegie Steel Co.
Central Steel Co.

Blower Fittings, Automatic Smokebox.
Barco Mfg. Co.

Blowers, Exhaust.
Mudge & Co.

Blowers, Turbo.
Ingersoll-Rand Co.
Sturtevant Co., B. F.

Blow Off Line Joints, Roundhouse—(See Joints, Etc.).

Boilers, Locomotive.
American Locomotive Co.
Baldwin Locomotive Works.

Boilers, Scale Proof.
Industrial Works.

Boilers, Water Tube.
Babcock & Wilcox.

Bolsters, Steel.
Brill Co., J. G., The.
Bradford Corp.
Pressed Steel Car Co.

Bolts and Nuts.
Bethlehem Steel Co.
Foster Co., L. B.
Ryerson & Son, Joseph T.

Bolts, Patch.
Falls Hollow Staybolt Co.

Bolts, Track.
Bethlehem Steel Co.
Illinois Steel Co.
Tennessee Coal, Iron & R. R. Co.

Bonding, Rail Outfits.
Ingersoll-Rand Co.

Books, Railway.
Gibson, Pribble & Co.
Simmons-Boardman Publishing Co.

Boosters, Locomotive.
Franklin Ry. Supply Co., Inc.

Booths, Telephone.
Dickinson, Inc., Paul.

Boring and Turning Mills, Vertical.
Bullard Machine Tool Co.

Boring and Drilling Machines, Horizontal.
Ryerson & Son, Joseph T.

Braces, Rail.
American Chain Co.
Bethlehem Steel Co.
Fort Pitt Malleable Iron Co.
Q. & C. Co., The
Ramapo Ajax Corp.

Brake Beams.
Bethlehem Steel Co.
Bradford Corp.
Brill Co., J. G., The.
Chicago Railway Equipment Co.
Davis Brake Beam Co.
Pressed Steel Car Co.

Brake Beam—Supports.
Chicago Railway Equipment Co.
Davis Brake Beam Co.

Brake Forgings, Pins, Levers, Etc.
Brill Co., J. G., The.
Steel Car Forge Co.

Brake Heads.
American Steel Foundries.
Brill Co., J. G., The.
Chicago Railway Equip. Co.

Brake Jaws.
Steel Car Forge Co.

Brake Shoes.
American Brake Shoe & Fdy. Co.
Brill Co., J. G., The
Buckeye Steel Castings Co.
Fort Pitt Malleable Iron Co.
Railway Materials Co.
Standard Brake Shoe & Foundry Co.

Brake Steps, Safety.
Irving Iron Works.

Brakes, Air.
General Electric Co.
Westinghouse Air Brake Co.

Brakes, Electric.
Westinghouse Air Brake Co.

Brakes, Hand.
Miner, W. H.
Union Railway Equipment Co.

Brick Locomotive Arch.
American Arch Co.

Bridge and Crossing Plank, Creosoted.
Century Wood Preserving Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.

Bridge Builders.
American Bridge Co.
Bethlehem Steel Co.

Bridge Stringers — (See Stringers, Bridge).

Buckets, Clam Shell.
Blaw-Knox Co.
Hayward Co.
Industrial Works.
McMyler Interstate Co.
Orton & Steinbrenner Co.

Buckets, Drag Line.
Hayward Co.

Buckets, Electric Motor.
Hayward Co.

Buckets, Grab.
American Bridge Co.
American Hoist & Derrick Co.
Blaw-Knox Co.
Hayward Co.
McMyler Interstate Co.
Orton & Steinbrenner Co.

Buckets, Orange Peel.
Hayward Co.

Buffers, Friction.
Miner, W. H.
Standard Coupler Co.
Westinghouse Air Brake Co.

Buffers, Radial.
Franklin Railway Supply Co., Inc.

Building Materials.
Johns-Manville, Inc.

Buildings, Iron, Steel and Steel Concrete.
Blaw-Knox Co.
McClellan & Junkersfeld, Inc.
Robinson Co., Dwight P.

Buildings, Portable Steel.
Blaw-Knox Co.

Bulkheads, All Steel.
Equipment Specialties Co.

Bulldozers.

Cable Accessories, Electrical.
Electric Service Supplies Co.
Ryerson & Son, Joseph T.

Cables, Electric.
American Steel & Wire Co.
General Electric Co.
Kerite Insulated Wire & Cable Co.
Okonite Co., The
Western Electric Co.

Cableways—(See Tramways).

Car Lighting Equipment — (See Lighting Car Equipment).

Carlines.
Hutchins Car Rfg. Co.

Car Lighting Equipment.
General Electric Co.

Car Material, Wood.
Exchange Sawmills Sales Co.
Great Southern Lumber Co.
Gulf Red Cypress Co.

Car Parts, Freight.
Pressed Steel Car Co.
Tennessee Coal, Iron & R. R. Co.

Car Parts and Appliances.
Pressed Steel Car Co.

Car Parts, Second-Hand.
Briggs & Turivas.

Car Repairs.
Pressed Steel Car Co.
Tennessee Coal, Iron & R. R. Co.

Car Steps, Safety.
American Mason Safety Tread Co.
Irving Iron Works.
Morton Mfg. Co.

Cars, Ballast.
Bethlehem Steel Co.
Rodger Ballast Car Co.

Cars, Shaped, Pressed Steel.
Morton Mfg. Co.

Cars, Dump.
Bethlehem Steel Co.
Clark Car Co.
Differential Steel Car Co.
McMyler Interstate Co.
Pressed Steel Car Co.

Cars, Freight.
Bethlehem Steel Co.
Pressed Steel Car Co.
Ralston Steel Car Co.
Tennessee Coal, Iron & R. R. Co.

Cars, Freight (New and Repaired).
Pressed Steel Car Co.

Cars, Gasoline-Electric.
Electro-Motive Co.

Cars, Gasoline Motor.
Brill Co., J. G., The.

Cars, Hand and Push.
Buda Co., The.
Fairmont Railway Motors, Inc.
Mudge & Co.

Cars, Industrial.
Bethlehem Steel Co.
Brill Co., J. G., The.
Foster Co., L. B.
Pressed Steel Car Co.

Cars, Motor (Inspection).
Buda Co., The.
Fairmont Railway Motors, Inc.
Mudge & Co.

Cars, Motor (Section).
Fairmont Railway Motors, Inc.
Mudge & Co.

Cars, Motor (Weed Mower).
Fairmont Ry. Motors, Inc.
Mudge & Co.

Cars, Ore.
Brill Co., J. G., The.
Clark Car Co.
Pressed Steel Car Co.

Cars, Passenger.
Brill Co., J. G., The.
Electro-Motive Co.
Pressed Steel Car Co.
Ralston Steel Car Co.

Cars, Power Unit.
Electro-Motive Co.

Cars, Rebuilt and Repaired.
Pressed Steel Car Co.
Ralston Steel Car Co.

Cars, Second Hand.
Briggs & Turivas.
Pressed Steel Car Co.

Cars, Self-Propelled Passenger.
Brill Co., J. G., The.
Electro-Motive Co.
General Electric Co.

Car Steps, Safety.
Amer. Mason Safety Tread Co.

Cars, Tank.
Bethlehem Steel Co.
Pressed Steel Car Co.

Cars, Trailer.
Fairmont Ry. Motors, Inc.
Mudge & Co.

Cars, Velocipede.
Buda Co., The

Castings, Brass and Bronze.
Keystone Bronze Co.

Castings, Grey Iron.
American Brake Shoe & Fdy. Co.
American Locomotive Co.
Baldwin Locomotive Works.
Ramapo Ajax Corp.

Castings Gun Iron.
Ramapo Ajax Corp.
Hunt-Spiller Mfg. Corp.

Castings, Malleable Iron.
American Malleable Castings Association.
Chicago Railway Equipment Co.
Fort Pitt Malleable Iron Co.
P. & M. Co., The
Pressed Steel Car Co.

Castings, Steel.
American Locomotive Co.
Bethlehem Steel Co.
Edgewater Steel Co.
McConway & Torley Co.
Pressed Steel Car Co.
Standard Brake Shoe & Foundry Co.
Standard Steel Works Co.
Tennessee Coal, Iron & Railroad Co.
Union Spring & Mfg. Co.
Union Steel Casting Co.

Castings, Steel Vanadium.
Union Steel Casting Co.

Cement, High Temperature
Johns-Manville, Inc.

Cement Tile.
Federal Cement Tile Co.

Center Plates—(See Bearings, Center).

Center Sills.
Bradford Corp.

Chain.
American Chain Co., Inc.

Chemists.
Hunt Co., Robt. W.

Chimneys, Cast Iron.
Dickinson, Inc., Paul.

Chucks, Lathe.
Bullard Machine Tool Co.

Cinder Handling Plants.
Roberts & Schaefer Co.

Circuit Breakers.
General Electric Co.

Clamps, Flanging.
Ryerson & Son, Joseph T.

Clamps, Guard Rail.
American Chain Co., Inc.
Buda Co., The

Clamps, Hose.
Westinghouse Air Brake Co.

Clamps, Pipe.
Franklin Ry. Supply Co., Inc.

Cleaners, Flue.
Ryerson & Son, Joseph T.

Coach and Coach Yard Steam Joints—(See Joints, Etc.).

Coal, Ore and Ash Handling Machines.
McMyler Interstate Co.
Orton & Steinbrenner Co.
Roberts & Schaefer Co.

Coaling Stations.
American Bridge Co.
Roberts & Schaefer Co.

Cocks, Angle.
Westinghouse Air Brake Co.

Compounds, Boiler.
Bird-Archer Co., The

Compressors, Air.
General Electric Co.
Ingersoll-Rand Co.
Western Elec. Co.
Worthington Pump & Mchy. Corp.

Concrete Floor Slabs.
Federal Cement Tile Co.

Concrete Reinforcement.
American Steel & Wire Co.
Ryerson & Son Joseph T.

Concrete Roofing, Tile.
Federal Cement Tile Co.

Condensers.
Ingersoll-Rand Co.

Condensing Apparatus.
Worthington Pump & Machinery Corp.

Conduits, Metallic Flexible.
Barco Mfg. Co.
Franklin Railway Supply Co., Inc.

Conduit, Underground.
Johns-Manville, Inc.

Connectors, Automatic T. P.—(See Train Pipe Connectors, Automatic).

Connectors, Electrical.
Electric Service Supplies Co.

Controllers, Electrical.
General Electric Co.

Conveyor, Ash—(See Coal, Ore and Ash Handling Mach.)

Conveying Machinery.
American Bridge Co.
Hayward Co.
McMyler Interstate Co.
Orton & Steinbrenner Co.

Couplers.
Franklin Railway Supply Co., Inc.
McConway & Torley Co.
Q. & C. Co., The.
Standard Coupler Co.
Westinghouse Air Brake Co.

Coupler Pockets—(See Draft Yokes).

Couplings, Hose.
Fort Pitt Malleable Iron Co.
Gold Car Htg. & Ltg. Co.
Ingersoll-Rand Co.
Westinghouse Air Brake Co.

Covering, Seat Rattan.
Hale & Kilburn Co.

Cranes, Electric Traveling.
McMyler Interstate Co.
Morgan Engineering Co.

Cranes, Gantry.
Morgan Engineering Co.
Orton & Steinbrenner Co.

Cranes, Jib.
McMyler Interstate Co.
Morgan Engineering Co.

Cranes, Locomotive.
American Hoist & Derrick Co.
McMyler Interstate Co.
Ohio Locomotive Crane Co.
Orton & Steinbrenner Co.

Cranes, Portable.
American Hoist & Derrick Co.
Elwell Parker Electric Co.
McMyler Interstate Co.
Orton & Steinbrenner Co.

Cranes, Tractor.
McMyler Interstate Co.
Orton & Steinbrenner Co.

Cranes, Wrecking.
McMyler Interstate Co.
Orton & Steinbrenner Co.

Crank Pins — (See Pins, Crank).

Creosote.
American Creosoting Co.
Century Wood Preserving Co.
Colonial Creosoting Co.
Georgia Creosoting Co.
International Creosoting & Construction Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.

Creosoted Lumber.
American Creosoting Co., Inc., The.
International Creosoting & Construction Co.

Cribbing Units.
Federal Cement Tile Co.

Crossings — (See Frogs and Crossings).

Cross Arms.
American Bridge Co.
Great Southern Lumber Co.
Western Elec. Co.

Crossheads and Shoes.
Barco Mfg. Co.

Cross-Ties.
Century Wood Preserving Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.

Crossing—Gates.
Buda Co., The

Crushers, Coal.
Orton & Steinbrenner Co.
Worthington Pump & Mchy. Corp.

Culverts.
American Rolling Mill Co., The

Curtains and Fixtures, Car Vestibule.
Morton Mfg. Co.

Curtains and Fixtures, Car Window.
Morton Mfg. Co.

Cushions, Loco.
Mudge & Co.

Cushions, Motor Car.
Mudge & Co.

Cutters, Flue.
Ryerson & Son, Joseph T.

Cyclopedias, Railway.
Simmons-Boardman Publishing Co.

Derails.
Q. & C. Co., The.

Derricks.
Carnegie Steel Co.
McMyler Interstate Co.

Derricks, Hand and Steel.
Hayward Co.

Devices, Safety, Motor Car.
Fairmont Railway Motors, Inc.
Mudge & Co.

Diaphragms for Cars, Canvas and Steel.
Morton Mfg. Co.

Diaphragms, Buffing Mechanism.
Morton Mfg. Co.

Digging Machines.
Buda Co., The

Disinfectants.
West Disinfecting Co.

Ditching Machinery.
American Hoist & Derrick Co.
Orton & Steinbrenner Co.

Door Fixtures—(See Fixtures, Car Door).

Door, Locomotive, Fire-Box.
Franklin Railway Supply Co., Inc.

Doors, Car.
Miner, W. H.
Union Railway Equipment Co.

Doors, Grain.
Exchange Sawmills Sales Co.

Doors, Steel.
Morton Mfg. Co.

Draft Arms.
Bradford Corp.

Draft Gears.
Bradford Corp.
Fort Pitt Malleable Iron Co.
Miner, W. H.
Standard Coupler Co.
Symington Co., T. H.
Union Draft Gear Co.
Walker Draft Gear Corp.
Westinghouse Air Brake Co.

Draft Yokes.
Miner, W. H.
Steel Car Forge Co.

Drawbar Centering Device.
Miner, W. H.
Union Railway Equipment Co.

Draw Bars, Unit Safety.
Franklin Railway Supply Co., Inc.

Dredging Machinery.
Hayward Co.

Drill Steel, Rock and Steel Sharpened.
Ingersoll-Rand Co.

Drilling Machines, Pneumatic.
Ingersoll-Rand Co.

Drilling Machines, Upright and Radial.
Ryerson & Son, Joseph T.

Drilling Machines, Rock.
General Electric Co.

Drills, Close Corner.
Ingersoll-Rand Co.

Drills, Concrete.
Ingersoll-Rand Co.

Drills, Earth.
Buda Co., The

Drills, Pneumatic.
Ingersoll-Rand Co.

Drills, Track and Bonding.
Bird-Archer Co., The
Buda Co., The

Driving Boxes (Extended Main).
Franklin Railway Supply Co.

Dynamos — (See Generators, Electric, Economizers, Fuel).

Economist.
Blood, Balch John.

Electrical Supplies.
Electric Service Supplies Co.
General Electric Co.

Electrification, Railroad.
Battey & Kipp.
General Electric Co.
McClelland & Junkersfeld.
Robinson Co., Dwight P.
Smith & Co., C. E.
Westinghouse Elect. & Mfg. Co.

Ends, Steel.
Hutchins Car Roofing Co.
Union Metal Products Co.

Engineers and Contractors.
Battey & Kipp.
Day & Zimmerman, Inc.
Roberts & Schaefer Co.
Robinson Co., Dwight P.

Engineers, Construction.
Battey & Kipp.
Day & Zimmerman, Inc.
McClelland & Junkersfeld.
Roberts & Schaefer Co.
Robinson Co., Dwight P.

Engineers, Consulting, Civil, Elec., Hydraulic, Mech., Val.
Battey & Kipp.
Day & Zimmerman, Inc.
Hunt Co., Robert W.
Muhlfeld, John E.
Smith & Co., C. E.

Engineers, Contracting.
Battey & Kipp.
Hunt Co., Robert W.
McClelland & Junkersfeld.
Muhlfeld, John E.
Smith & Co., C. E.

Engineers, Inspecting.
Hunt Co., Robert W.
Muhlfeld, John E.
Smith & Co., C. E.

Engineers, Roofing.
Federal Cement Tile Co.

Engineers, Valuation.
Blood, Balch John.

Engines, Crude and Fuel Oil.
Ingersoll-Rand Co.
Worthington Pump & Mchy. Corp.

Engines, Electric Driven.
Ingersoll-Rand Co.

Engines, Gas and Gasoline.
Buda Co., The
Ingersoll-Rand Co.
Mudge & Co.
Worthington Pump & Mchy. Corp.

Engines, Gasoline.
Fairmont Railway Motors, Inc.

Engines, Hoisting.
American Hoist & Derrick Co.
Industrial Works.
McMyler Interstate Co.
Orton & Steinbrenner Co.

Expanders, Tube.
Ryerson & Son, Joseph T.

Fans, Exhaust and Ventilating.
General Electric Co.
Mudge & Co.
Western Electric Co.

Fasteners, Car Door.
Fort Pitt Malleable Iron Co.
Miner, W. H.

Ferro Molybdenum.
Vanadium Corp. of America.

Ferro, Tungsten.
Vanadium Corp. of America.

Ferro Vanadium.
Vanadium Corp. of America.

Fencing, Wire — (See Wire Fence).

Filters, Water, and Industrial.
American Water Softener Co.

Filtration Plants, Water.
American Water Softener Co.

Fireboxes.
American Locomotive Co.
Baldwin Locomotive Works.

Fire-Fighting and Protection Equipment.
Johns-Manville, Inc.

Fittings, Air Brake.
Westinghouse Air Brake Co.

Fixtures, Car Door.
Miner, W. H.
Union Railway Equipment Co.

Flangers, Snow.
Q. & C. Co., The.

Floodlights.
Electric Service Supplies Co.
Tuco Products Corp.
Western Electric Co.

Flooring.
Johns-Manville, Inc.

Flooring, Composition.
American Mason Safety Tread Co.
Johns-Manville, Inc.

Flooring, Steel.
Irving Iron Works.
Morton Mfg. Co.

Flooring, Wood.
Century Wood Preserving Co.
Jennison Wright Co.
Long-Bell Lumber Co., The.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.

Flooring, Wood Block — (See also Blocks, Creosoted).
Exchange Sawmills Sales Co.

Flue Cleaners—(See Cleaners, Flue).

Flue Cutters — (See Cutters, Flue).

Flue Shop Equip.
Ryerson & Son Joseph T.

Flues, Boiler — (See Tubes, Boiler).

Forges, Rivet Heating.
Ryerson & Son, Joseph T.

Forging Presses.
Morgan Engineering Co.

Forgings.
American Bridge Co.
Bethlehem Steel Co.
Brill Co., J. G., The
Carnegie Steel Co.
Edgewater Steel Co.
Illinois Steel Co.
Johnson & Co., J. R.
McMyler Interstate Co.
Pressed Steel Car Co.
Steel Car Forge Co.
Tennessee Coal, Iron & R. R. Co.

Forgings, Drop.
Brill Co., J. G., The
Steel Car Forge Co.

Forms, Steel, for Concrete Construction.
Blaw-Knox Co.

Foundations.
Smith & Co., C. E.

Foundry Sand Handling Equipment.
Hayward & Co.

Foundry Supplies.
Bird-Archer Co., The

Frames, Locomotive.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works.
Union Steel Casting Co.

Frames, Safety Motor Car.
Fairmont Railway Motors, Inc.

Frames, Truck.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works.
Brill Co., J. G., The
Franklin Railway Supply Co., Inc.
Pressed Steel Car Co.

Frames, Vanadium.
American Locomotive Co.
Baldwin Locomotive Works.
Union Steel Casting Co.

Frogs and Crossings.
Bethlehem Steel Co.
Buda Co., The
Foster Co., L. B.
Ramapo Ajax Corp.

Frogs, Wrecking.
Buda Co., The

Fulcrums, Brake Beam.
Brill Co., J. G., The
Chicago Ry. Equipment Co.

Furnaces, Electric.
General Electric Co.

Furnaces, Rivet Heating—(See Forges, Rivet Heating).

Fuses.
Western Elec. Co.

Gage Testers — (See Testers, Gage).

Gages, Steam.
Ashton Valve Co.

Gages, Wheel Press Recording.
Ashton Valve Co.

Gates Crossing.
Buda Co., The

Gates, Tail.
Morton Mfg. Co.

Gauges, Track.
Buda Co., The

Gear Blanks, Rolled Steel.
Standard Steel Works Co.

Gears, Silent.
General Electric Co.

Gears, Valve — (See Valve Gears).

Generators, Car Lighting.
Safety Car Lighting & Heating Co.

Generators, Electric.
Electric Service Supplies Co.
General Electric Co.
Western Elec. Co.

Glass, Wire.
Mississippi Wire Glass Co.

Graphite, Lubricating.
Franklin Ry. Oil Co.
Galena Signal Oil Co.

Grapples, Wood.
Hayward Co.

Grate Shakers, Automatic.
Franklin Railway Supply Co., Inc.

Grating, Steel.
Irving Iron Works.

Grease Forming Machines.
Franklin Railway Supply Co., Inc.

Grinders, Portable.
Buda Co., The

Grinding Machines, Portable.
Ingersoll-Rand Co.

Guard Rail (One Piece).
American Chain Co., Inc.
Bethlehem Steel Co.
Ramapo Ajax Co.

Guard Rail.
Buda Co., The

Guards, Cattle.
American Bridge Co.

Guards, Dust.
Symington Co., The

Guards, Incandescent Lamp.
Electric Service Supplies Co.

Hair Felt.
Johns-Manville, Inc.

Hammers, Pneumatic.
Ingersoll-Rand Co.
Western Elec. Co.

Hammers, Riveting.
Ingersoll-Rand Co.

Hammers, Steam.
Morgan Engineering Co.

Hand Brakes — (See Brakes, Hand).

Hangers, Car Door—(See Fixtures, Car Door).
Ryerson & Son, Joseph T.

Hatchways, Beveled.
Equipment Specialties Co.

Headlight Reflectors and Cases.
Buda Co., The
Electric Service Supplies Co.

Headlight Repair Parts, Electric.
Buda Co., The
Electric Service Supplies Co.

Headlights, Electric.
Electric Service Supplies Co.
General Electric Co.

Heaters, Elec. Rivet.
American Hoist & Derrick Co.

Heaters, Electric & Ltg.
Gold Car Htg. & Ltg. Co.

Heaters, Feed Water.
Superheater Co., The
Worthington Pump & Mchy. Corp.

Heating and Ventilating Apparatus.
Vapor Car Heating Co., Inc.

Heating Systems, Car (Electric and Steam).
Gold Car Htg. & Ltg. Co.
Safety Car Heating Co., Inc.
Vapor Car Heating Co., Inc.

Hoisting Machinery.
American Bridge Co.
McMyler Interstate Co.
Orton & Steinbrenner Co.

Hoists, Air.
Ingersoll-Rand Co.

Hoists, Chain.
Ryerson & Son, Joseph T.

Hoists, Electric.
American Hoist & Derrick Co.

Hoists, Pneumatic.
Ingersoll-Rand Co.

Holders, Angle Cock.
Mudge & Co.

Hoppers, Wet and Dry (Car).
Duner Co.

Hose, Air, Steam, Etc.
Ingersoll-Rand Co.
Westinghouse Air Brake Co.

Ice Grates.
Equipment Specialties Co.

Ingots.
Edgewater Steel Co.
Illinois Steel Co.
McConway & Torley Co.

Injectors, Exhaust Steam.
Superheater Co., The

Inspection of Material and Equipment — (See Engineers, Inspection).

Insulation, Car.
Johns-Manville, Inc.
Lehon Co., The.

Insulation, Electrical.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville, Inc.
Western Elec. Co.

Insulation, Heat.
Johns-Manville, Inc.

Iron Chain.
Falls Hollow Staybolt Co.

Iron, Charcoal.
Ewald Iron Co.
Falls Hollow Staybolt Co.
Parkesburg Iron Co.

Iron, Hollow Staybolt Bars.
Falls Hollow Staybolt Co.

Iron, Pig.
Bethlehem Steel Co.
Illinois Steel Co.
Lockhart Iron & Steel Co.

Iron, Refined.
Ewald Iron Co.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.

Iron Staybolt—(See also Staybolts).
Bethlehem Steel Co.
Falls Hollow Staybolt Co.
Lockhart Iron & Steel Co.
Ryerson & Son, Joseph T.

Jacks.
Buda Co., The

Jacks, Lifting.
Buckeye Jack Mfg. Co.
Dickinson, Inc., Paul.

Jacks, Smoke.
Johns-Manville, Inc.

Joints, Air Reservoir.
Barco Mfg. Co.
Franklin Ry. Supply Co., Inc.

Joints, Blow Off Line (Roundhouse).
Barco Mfg. Co.
Franklin Ry. Supply Co., Inc.

Joints, Coach and Coach Yard.
Barco Mfg. Co.
Franklin Ry. Supply Co., Inc.

Joints, Flexible.
Barco Mfg. Co.
Franklin Ry. Supply Co., Inc.
Q. & C. Co., The

Joints, Rail.
American Chain Co., Inc.
Carnegie Steel Co.
Illinois Steel Co.
Q. & C. Co., The.
Tennessee Coal, Iron & R. R. Co.
Rail Joint Co.

Joints, Steam, Air and Liquid.
Barco Mfg. Co.
Franklin Ry. Supply Co., Inc.

Joints, Stop.
American Chain Co., Inc.

Journal Box Packing.
Lillie Co., Dexter P.

Journal Boxes and Lids.
Allegheny Steel Co.
American Steel Foundries.
Brill Co., J. G., The
Hunt-Spiller Mfg. Corp.
Railway Steel Spring Co.
Symington Co., T. H.
Union Spring & Mfg. Co.

Keys, Brake Shoe.
Bradford Corp.
Steel Car Forge Co.

Knuckles, Emergency.
Q. & C. Co., The

Laboratories, Testing.
Hunt Co., Robert W.

Ladders, Steel Car.
Union Railway Equipment Co.

Lamps, Incandescent.
Electric Service Supplies Co.
General Electric Co.
Western Elec. Co.

Lathes, Automatic Chucking and Turning.
Bullard Machine Tool Co.

Lathes, Engine.
Ryerson & Son, Joseph T.

Lathes, Turret Vertical.
Bullard Machine Tool Co.

Lath, Metal.
American Rolling Mill Co., The

Lighting Equipment, Car.
Safety Car Lighting & Heating Co.

Line Material.
Electric Service Supplies Co.

Locomotive Repairs.
Morgan Engineering Co.

Locomotives, Contractors.
American Locomotive Co.
Baldwin Locomotive Works.
Lima Locomotive Works.

Locomotives, Electric.
American Locomotive Co.
Baldwin Locomotive Works.
General Electric Co.

Locomotives, Gasoline.
Baldwin Locomotive Works.

Locomotives, Gasoline-Electric
Electro-Motive Co.

Locomotives, Industrial.
American Locomotive Co.
Baldwin Locomotive Works.
General Electric Co.
Lima Locomotive Works.

Locomotives, Mine.
American Locomotive Co.
Baldwin Locomotive Works.
General Electric Co.

Locomotives, Rebuilt.
American Locomotive Co.
Morgan Engineering Co.

Locomotive Repair Parts.
American Locomotive Co.
Baldwin Locomotive Works.
Lima Locomotive Works.

Locomotives, Oil.
Ingersoll-Rand Co.

Locomotives, Second Hand.
Briggs & Turivas.

Locomotives, Steam.
American Locomotive Co.
Baldwin Locomotive Works.
Lima Locomotive Works.

Lubricants (Oil and Grease).
Franklin Ry. Oil Co.
Galena Signal Oil Co.

Lubricators, Driving Box.
Franklin Railway Supply Co., Inc.

Lubricators, Piston Rods.

Lumber.
Great Southern Lumber Co.
Exchange Sawmills Sales Co.
Foote Lumber Co., H. D.
Jennison Wright Co.
Long-Bell Lumber Co., The

Lumber, Asbestos.
Johns-Manville, Inc.

Lumber, Creosoted.
Century Wood Preserving Co.
Great Southern Lumber Co.
Gulf States Creosoting Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.

Mechanical Draft Apparatus—(See Heating and Vent. App.).

Melters, Electric, Snow.
Q. & C. Co., The

Meters, Water and Oil.
Worthington Pump & Machinery Corp.

Milling Machines, Plain and Universal.
Ryerson & Son, Joseph T.

Mixing Machines, Concrete.
Blaw-Knox Co.

Motors, Electric.
General Electric Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

Motors, Gasoline.
Sterling Engine Co.

Nails.
American Steel & Wire Co.

Nozzles, Exhaust.
Franklin Railway Supply Co., Inc.

Nuts—(See Bolts and Nuts).

Oil Filtering and Storage Systems.
American Water Softener Co.

Oil Plugs, Steam Chest.
Franklin Railway Supply Co., Inc.

Oils, Lubricating.
Franklin Ry. Oil Co.
Galena Signal Oil Co.

Oxygen.
Dunham Co., Keith.

Oxygen Plants.
Dunham Co., Keith.

Packing, Air Pump.
Johns-Manville, Inc.

Packing Cylinder and Valve Ring.
Hunt-Spiller Mfg. Corp.

Packing, Soft.
Johns-Manville, Inc.

Packing, Locomotive Boiler.
Johns-Manville, Inc.

Packing, Locomotive Cab Cock.
Johns-Manville, Inc.

Packing Sheet.
Johns-Manville, Inc.

Packing, Throttle.
Johns-Manville, Inc.

Paints.
Lehon Co., The

Paper Car Liners — (See Car Liners, Paper).

Paper Sheathing.
Lehon Co., The

Pavement Breakers.
Ingersoll-Rand Co.

Pile Drivers.
McMyler Interstate Co.
Orton & Steinbrenner Co.

Piling, Creosoted.
Century Wood Preserving Co.
International Creosoting & Constr. Co.
Jennison Wright Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.

Piling, Sheet Steel.
American Bridge Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Pins, Air Brake and Clevis.
Steel Car Forge Co.

Pins, Center.
Miner, W. H.

Pins, Coupler Knuckle.
McConway & Torley Co.
Steel Car Forge Co.

Pins, Crank.
American Locomotive Co.
Baldwin Locomotive Works.
Johnson & Co., J. R.

Pipe Fittings—(See Fittings, Pipe).

Pipe Coverings.
Johns-Manville, Inc.

Pipe, Metal Culvert.
American Rolling Mill Co., The

Planers.
Ryerson & Son, Joseph T.

Plates, Boiler, Firebox—(See Steel Firebox).

Plates, Center—(See Bearings, Center).

Plates, Follower.
Steel Car Forge Co.

Plates, Iron and Steel.
American Rolling Mill Co., The.
Bethlehem Steel Co.
Carnegie Steel Co.
Illinois Steel Co.
Ryerson & Son, Joseph T.
Tennessee Coal, Iron & R. R. Co.

Plates, Tie.
Bethlehem Steel Co.
Foster Co., L. B.
Illinois Steel Co.
Tennessee Coal, Iron & R. R. Co.

Platforms, Car.
Irving Iron Works.
Standard Coupler Co.

Plows, Snow.
American Locomotive Co.
Brill Co., J. G., The
Q. & C. Co., The

Plush, Mohair.
Massachusetts Mohair Plush Co.
Great Southern Lumber Co.

Pneumatic Tools.
Ingersoll-Rand Co.

Poles.
Gulf States Creosoting Co.
Long-Bell Lumber Co., The

Poles, Creosoted.
Century Wood Preserving Co.
Gulf States Creosoting Co.
International Creosoting & Constr. Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.

Poles, telephone & telegraph.
Western Elec. Co.

Posts, Bumping.
Buda Co., The

Posts, Steel Fence.
American Steel & Wire Co.
Q. & C. Co., The

Powder Blasting—(See Explosives).

Powdered Coal Equipment.
Muhlfeld, John E.

Power Plants.
General Electric Co.
McClelland & Junkersfeld, Inc.
Muhlfeld, John E.

Preservatives, Wood.
Century Wood Preserving Co.
Jennison Wright Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.
Western Electric Co.

Pressed Steel Repair Parts.
Pressed Steel Car Co.
Tennessee Coal, Iron & R. R. Co.

Pulverizers, Coal—(See Crushers, Coal).

Pumps and Pumping Machinery.
Ingersoll-Rand Co.
Worthington Pump & Mchy. Corp.

Pumps, Vacuum.
Ingersoll-Rand Co.

Punching and Shearing Machines.
Ryerson & Son, Joseph T.

Pushers, Locomotive Coal.
Locomotive Stoker Co.

Pyrometers, Superheated Steam.
Superheater Co., The.

Rail Anchors.
P. & M. Co., The

Rail Benders.
American Chain Co., Inc.
Q. & C. Co., The

Rail-Bonds.
American Steel & Wire Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Rail Braces — (See Braces, Rail).

Rail Laying Machines.
Fairmont Ry. Motors, Inc.

Rail, Manganese.
Electric Service Supplies Co.
Manganese Steel Rail Co.

Rail Reclamation Equip.
Ryerson & Son Joseph T.

Railroad Structures — (See Engineers and Contractors, also Buildings).

Rails.
Bethlehem Steel Co.
Carnegie Steel Co.
Foster Co., L. B.
Illinois Steel Co.

Rail Bonds.
Western Electric Co.

Rails, Industrial.
Ryerson & Son Joseph T.

Rails, Relaying.
Briggs & Turivas.
Foster Co., L. B.

Rail Splice Plates — (See Joints, Rail).

Rattan.
Hale-Kilburn Co.

Receivers, Air.
Ingersoll-Rand Co.

Rectifiers for Signal Work.
General Electric Co.

Reflectors, Electric Light.
Western Electric Co.

Reflectors, Headlight.
Electric Service Supplies Co.

Refrigerator Car Equipment.
Union Railway Equipment Co.

Replacers, Car.
American Chain Co., Inc.
Q. & C. Co., The

Replacers, Car & Locomotive.
Buda Co., The

Reverse Gear, Power.
Barco Mfg. Co.
Franklin Railway Supply Co., Inc.

Rivet Cutters.
Ingersoll-Rand Co.

Riveting Machines.
Ingersoll-Rand Co.

Rivets.
Pressed Steel Car Co.
Ryerson & Son, Joseph T.

Roller Bearings — (See Bearings, Roller).

Roofs.
Federal Cement Tile Co.

Roofing, Asbestos.
Johns-Manville, Inc.

Roofing, Buildings.
American Rolling Mill Co., The
Johns-Manville, Inc.
Lehon Co., The

Roofing, Car.
American Rolling Mill Co., The
Hutchins Car Roofing Co.
Johns-Manville, Inc.
Lehon Co., The

Roofing, Corrugated.
American Rolling Mill Co., The
Johns-Manville, Inc.

Roofing, Wood.
Exchange Sawmills Sales Co.

Rope, Wire — (See Wire Rope)

Rosin.
Great Southern Lumber Co.

Running Boards, Car.
Irving Iron Works.
Standard Ry. Equipment Co.

Runways.
Irving Iron Works.

Saddles, Running Board.
Miner, W. H.

Sand Drying Plants.
Roberts & Schaefer Co.

Sanders, Locomotive.
Brill Co., J. G., The

Sanitary Products.
West Disinfecting Co.

Saws, High Speed Friction.
Ryerson & Son, Joseph T.

Scrap Iron.
Briggs & Turivas.

Scrapers, Cable, Drag.
Hayward Co.

Seats, Car.
Brill Co., J. G., The.
Hale-Kilburn Co.

Shafting.
Falls Hollow Staybolt Co.
Johnson & Co., J. R.
Ryerson & Son, Joseph T.

Shapes, Pressed Steel.
Morton Mfg. Co.
Pressed Steel Car Co.

Shapes, Structural.
Carnegie Steel Co.
Illinois Steel Co.
Ryerson & Son, Joseph T.
Tennessee Coal, Iron & R. R. Co.

Shapers.
Ryerson & Son, Joseph T.

Sheds, Train.
American Bridge Co.

Sheets, Black and Galvanized.
American Rolling Mill Co.
Ryerson & Son, Joseph T.

Sheets, Corrugated.
American Rolling Mill Co.
Johns-Manville, Inc.

Sheets, Electrical.
American Rolling Mill Co., The

Sheets, Locomotive Jacket.
American Rolling Mill Co.

Sheets, Steel.
American Rolling Mill Co., The
Bethlehem Steel Co.
Ryerson & Son, Joseph T.
Tennessee Coal, Iron & R. R. Co.

Sherardizing Plants.
General Electric Co.

Shovels, Gas.
Orton & Steinbrenner Co.

Shops, Railroad—(See Buildings, Iron, Steel and Steel Concrete).

Siding, Corrugated and Plain.
American Rolling Mill Co., The
Johns-Manville, Inc.

Signal Accessories.
General Electric Co.

Slabs, Concrete Floor.
Federal Cement Tile Co.

Slabs, Concrete Roof.
Federal Cement Tile Co.

Slabs, Steel.
Tennessee Coal, Iron & R. R. Co.

Slag, Blast Furnace.
Carnegie Steel Co.

Soap, Liquid.
West Disinfecting Co.

Solder.
Western Electric Co.

Spikes.
American Steel & Wire Co.
Foster Co., L. B.
Illinois Steel Co.
Tennessee Coal, Iron & R. R. Co.

Splice Bars, Angle.
Carnegie Steel Co.
Illinois Steel Co.

Splice Bars, Rail.
Bethlehem Steel Co.
Foster Co., L. B.

Spring Plates or Seats.
Allegheny Steel Co.

Springs.
American Steel Foundries.
American Steel & Wire Co.
Fort Pitt Spring & Mfg. Co.
Pittsburgh Spring & Steel Co.
Railway Steel Spring Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Springs, Machinery for Repairing.
Ryerson & Son, Joseph T.

Springs, Vanadium Steel.
Pittsburgh Spring & Steel Co.

Stacks, Steel.
American Bridge Co.

Stands, Switch and Target.
Buda Co., The
Q. & C. Co., The.

Statistician.
Blood, Balch John.

Staybolts.
American Locomotive Co.
Bethlehem Steel Co.
Falls Hollow Staybolt Co.
Flannery Bolt Co.
Ryerson & Son, Joseph T.

Staybolts, Hollow.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.

Steam Cheats.
Franklin Railway Supply Co., Inc.

Steam Shovels.
Orton & Steinbrenner.

Steel, Alloy.
Bethlehem Steel Co.
Central Steel Co.

Steel, Firebox.
Bethlehem Steel Co.
Carnegie Steel Co.
Illinois Steel Co.

Steel, Heat Treated.
Bethlehem Steel Co.

Steel Plate Construction.
Blaw-Knox Co.

Steel, Pressed Specialties.
Hale-Kilburn Co.

Steel, Structural.
American Bridge Co.
Blaw-Knox Co.
Illinois Steel Co.
Ryerson & Son, Joseph T.

Steel, Tool.
Illinois Steel Co.
Ryerson & Son, Joseph T.
Standard Stoker Co.
Tennessee Coal, Iron & R. R. Co.

Step Joints.
Q. & C. Co., The.
Rail Joint Co.

Steps, Car — (See Car Steps, Safety).

Stokers, Locomotive.
Locomotive Stoker Co.
Standard Stoker Co.

Stringers, Bridge.
Long-Bell Lumber Co., The.

Stringers, Bridge, Creosoted.
Century Wood Preserving Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.

Superheaters.
Babcock & Wilcox.
Superheater Co., The

Switch Boards.
Johns-Manville, Inc.

Switches, Electric.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Switches and Switch Stands.
Bethlehem Steel Co.
Foster Co., L. B.
McMyler Interstate Co.
Ramapo Ajax Corp.

Tamping Machines, Tie.
Ingersoll-Rand Co.

Tamping Outfits, Tie.
Ingersoll-Rand Co.

Tanks, Air, Gas, Oil, etc.
American Bridge Co.
American Locomotive Co.
Babcock & Wilcox.
Westinghouse Air Brake Co.

Tanks, Water.
American Locomotive Co.
Babcock & Wilcox.

Tape, Insulation.
Okonite Co., The.

Tape, Insulating.
Johns-Manville, Inc.

Telephone & Telegraph Equip. Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Telephones.
Western Electric Co.

Taps, Staybolt.
Ryerson & Son, Joseph T.

Terminals, Freight.
Austin Co., The

Terminals, Railroad.
McClelland & Junkersfeld, Inc.
Robinson Co., Dwight P.

Testers, Gage.
Ashton Valve Co.

Ties, Creosoted.
Century Wood Preserving Co.
Great Southern Lumber Co.
International Creosoting & Construction Co.
Jennison Wright Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.
Elwell Parker Electric Co.

Ties, Steel.
American Bridge Co.

Ties, Wood.
Century Wood Preserving Co.
Exchange Sawmills Sales Co.
Great Southern Lumber Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.

Ties, Zinc Treated.
Century Wood Preserving Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.

Tile, Cement Roofing.
Federal Cement Tile Co.

Timber.
Exchange Sawmills Sales Co.
Great Southern Lumber Co.
Gulf States Creosoting Co.
International Creosoting & Construction Co.
Long-Bell Lumber Co.

Timber, Creosoted.
Century Wood Preserving Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.

Tires, Steel.
Edgewater Steel Co.
Railway Steel Spring Co.
Standard Steel Works Co.

Tools, High Speed Steel.
Bird-Archer Co., The

Track Work Manganese.
Buda Co., The

Tractors, Industrial.
Elwell Parker Electric Co.

Tramways.
Blaw-Knox Co.

Tramways (Wire Rope).
American Steel & Wire Co.

Transfer Tables.
American Bridge Co.
Nichols & Bros., Geo. P.

Transformers.
Western Electric Co.

Transmission Towers.
Blaw-Knox Co.

Trap Doors and Fixtures.
Tuco Products Corp.

Traps, Steam.
Johns-Manville, Inc.

Treads, Safety.
American Mason Safety Tread Co.
Morton Mfg. Co.

Treatment Water — (See Water Softening and Purifying).

Truck Frames — (See Frames Truck).

Trucks, Car.
Brill Co., J. G., The

Trucks, Car and Locomotive.
American Locomotive Co.
Baldwin Locomotive Works.
Franklin Railway Supply Co., Inc.
Pressed Steel Car Co.
Standard Car Truck Co.

Trucks, Electric Storage Battery.
Elwell Parker Electric Co.

Trucks, Trailer.
Brill Co., J. G., The
Franklin Railway Supply Co., Inc.

Tructors.
Elwell-Parker Electric Co., The.

Tubes, Arch.
Parkesburg Iron Co.

Tubes, Boiler.
Allegheny Steel Co.
Bethlehem Steel Co.
Parkesburg Iron Co.
Ryerson & Son, Joseph T.

Tubes, Boiler, Charcoal, Iron.
Bethlehem Steel Co.
Parkesburg Iron Co.

Tubes, Stay.
Falls Hollow Staybolt Co.

Tungsten, Metal.
Vanadium Corp. of America.

Turbo Generators.
Electric Service Supplies Co.
General Electric Co.

Turnbuckles.
American Bridge Co.
Ryerson & Son Joseph T.

Turntable Tractors.
Nichols & Bros., Geo. P.

Turntables.
American Bridge Co.
Bethlehem Steel Co.
Edgewater Steel Co.
Foster Co., L. B.
McMyler Interstate Co.
Bellers & Co., Inc., Wm.

Turpentine.
Great Southern Lumber Co.

Uncoupling Device.
Hutchins Car Rfg. Co.
Union Railway Equipment Co.

Underframes, Steel.
Brill Co., J. G., The
Pressed Steel Car Co.
Ralston Steel Car Co.
Tennessee Coal, Iron & R. R. Co.

Upholstery, Car.
Brill Co., J. G., The
Mass. Mohair Plush Co.

Valves, Drifting.
Franklin Railway Supply Co., Inc.

Valves, Piston.
Franklin Railway Supply Co., Inc.

Valves, Pop, Safety and Relief.
Ashton Valve Co.
Westinghouse Air Brake Co.

Valves, Throttle.
Bradford Corp.

Ventilators, Car.
Gold Car Htg. & Ltg. Co.
Mudge & Co.
Vapor Car Heating Co., Inc.

Ventilators, Shop and Roundhouse.
Dickinson, Inc., Paul.
Johns-Manville, Inc.

Waste.
Lillie Co., Dexter P.

Water Softening and Purifying.
American Water Softener Co.
Bird-Archer Co., The

Waterproofing Materials.
Johns-Manville, Inc.
Lehon Co., The.

Water Purifying Materials and Compounds.
Bird-Archer Co., The

Wedges, Automatic.
Franklin Ry. Supply Co., Inc.

Wedges, Journal Box.
American Steel Foundries.
Pressed Steel Car Co.
Steel Car Forge Co.

Weed Burners.
Fairmont Ry. Motors, Inc.

Welding Machines, Electric.
General Electric Co.

Welding Machines, Flue.
Ryerson & Son, Joseph T.

Welding and Cutting Apparatus — (See Cutting and Welding Apparatus).

Welding Rods.
Ryerson & Son Joseph T.

Welding Machines, Acetylene and Electric.
Ryerson & Son Joseph T.

Welding Supplies.
General Electric Co.

Well Traps.
Equipment Specialties Co.

Wheel Centers, Driving.
American Locomotive Co.
Baldwin Locomotive Works.
Edgewater Steel Co.
Hunt-Spiller Mfg. Corp.
Standard Steel Works Co.
Union Steel Casting Co.

Wheels, Car and Locomotive.
American Locomotive Co.
Baldwin Locomotive Works.
Bethlehem Steel Co.
Carnegie Steel Co.
Edgewater Steel Co.
Illinois Steel Co.
Pressed Steel Car Co.
Railway Steel Spring Co.
Standard Steel Works Co.

Wheels, Cast Iron.
Pressed Steel Car Co.

Wheels, Hand, Push and Motor Car.
Buda Co., The
Fairmont Railway Motors, Inc.
Mudge & Co.

Wheels, Mine Car.
Carnegie Steel Co.
Edgewater Steel Co.

Wheels, Pressed Steel Motor Car.
Mudge & Co.

Wheels, Rolled Steel.
Buda Co., The

Wheels, Steel and Steel Tired.
Carnegie Steel Co.
Edgewater Steel Co.
Illinois Steel Co.

Whistles, Locomotive.
Ashton Valve Co.
General Electric Co.
Westinghouse Air Brake Co.

Windows, Weatherproofing.
Morton Mfg. Co.

Wire.
American Steel & Wire Co.
Kerite Insulated Wire & Cable.

Wire, Barb.
American Steel & Wire Co.

Wire, Fence.
American Steel & Wire Co.
Illinois Wire & Mfg. Co.

Wire, Insulated.
American Steel & Wire Co.
General Electric Co.
Kerite Insulated Wire & Cable.
Okonite Co., The.
Western Electric Co.

Wire, Rail Bond—(See Rail Bonds).

Wire, Rope.
American Steel & Wire Co.

Wire, Telephone and Telegraph.
American Steel & Wire Co.
Western Electric Co.

Wood, Creosoted.
Jennison Wright Co.

Wood Preservative—(See Preservative Wood).

Wrecking Cranes — (See Cranes, Wrecking).

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Steel-Tired Wheels

THE superiority of "Railway" Steel-Tired Wheels has been effectively demonstrated by the excellent service obtained from this equipment on many of the leading railroads in this country and abroad.

They have been especially designed to meet the most exacting requirements of modern operating conditions, while their manufacture embodies the highest grade workmanship and materials. We are prepared to furnish various types of steel tired wheels with cast iron, cast steel or forged and rolled steel centers fitted with either Latrobe or Inter-Ocean Tires. The centers and tires are turned and bored to standard gauges and are interchangeable.

Railway Steel-Spring Company

30 CHURCH ST., NEW YORK

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